The RUBBER AGE

February, 1946

TECHNOLOGY DEPT.

THREE WINNERS

KALVAN

for non-black compounds

BONDOGEN

for plasticizing Rubber, Reclaim and Synthetics

CUMATE

for fastest curing, safe processing GR-S stocks

R. T. VANDERBILT CO., INC.

230 Park Avenue, New York City

Du Pont
NEWSLETTER No. 2, FEB. 1946
RUBBER CHEMICALS DIVISION
PUBLISHED BY E. I. DU PONT DE NEMOURS & CO. (INC.), WILMINGTON 98, DELAWARE

BARAK—ACCELERATOR ACTIVATOR

BARAK is unique in its effect on GR-S stocks. While it is completely inactive when used by itself, even in large amounts, it is a strong activator for acidic accelerators. Barak is an excellent activator for 2-MT and for all of the thiazoles, but it appears to be of most value when used in conjunction with MBTS.

AMOUNT TO USE: To obtain the highest efficiency from the combination, it is desirable to use a relatively high ratio of Barak to MBTS. In a GR-S stock containing easy processing channel black, a combination of 0.5 to 0.75 part Barak with 0.75 to 0.5 part of MBTS is usually preferred. The use of Barak results in stocks having a flatter cure and vulcanizates having both a high degree of resistance to crack growth and to deterioration on heat aging.

OUTSTANDING PROPERTIES: Chemically, Barak is dibutyl ammonium oleate. Being a non-accelerator of vulcanization, Barak is inherently non-persistent in GR-S. Its relatively strong activating effect on MBTS permits maintenance of a fast rate of cure in the presence of relatively small amounts of the thiazole accelerator as is shown in chart opposite. The faster rate and higher state of cure obtained by Barak activation are indicated by the higher modulus and the smaller change in all properties with extended cure. The decrease in heat build-up further substantiates this fact.

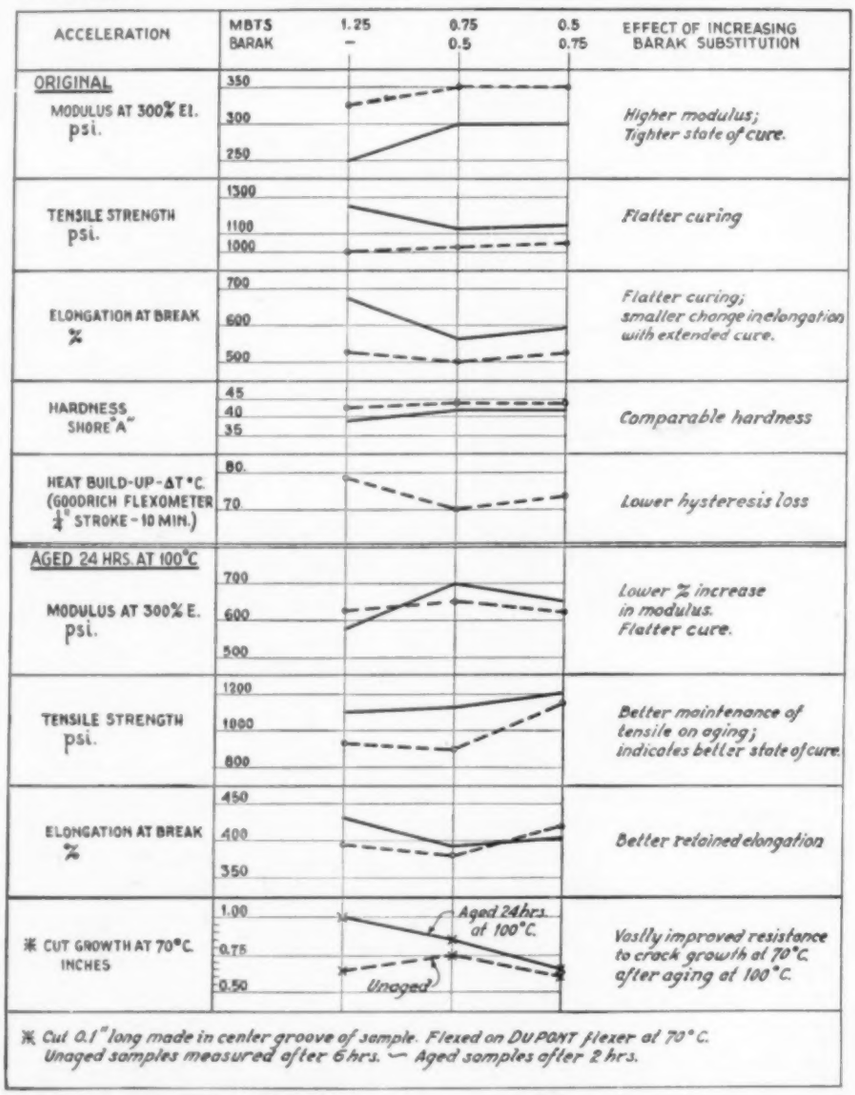
A consistent improvement in properties after aging at 100° C. is obtained by increasing the ratio of Barak to MBTS. The effect of Barak on resistance to crack growth after aging is outstanding. While the stock accelerated with straight MBTS cracked the full one-inch width in 2 hours when flexed at 70° C., the substitution of Barak for increasingly large amounts of the MBTS caused a proportional reduction in crack growth. As shown, the substitution of MBTS 0.5–Barak 0.75 for MBTS 1.25 parts reduced crack growth by 40 per cent.

USES: This is only one of the many uses of Barak. From the chart shown here it will be observed that the characteristics which it imparts to a vulcanizate suggest a multitude of uses in all types of products. Prior to the war it was extensively used as an activator in crude rubber and no doubt you will wish to keep it in mind as the availability of crude increases.

THE EFFECT OF BARAK ACTIVATION OF MBTS IN A GR-S STOCK

Base Compound	
GR-S	100.
Sulfur	2.
E.P.C. Black	20.
Softener	8.
Zinc Oxide	3.
Accelerator	As indicated

KEY — CURE
——— 60 min. at 280° F.
— — — 90 min. at 280° F.

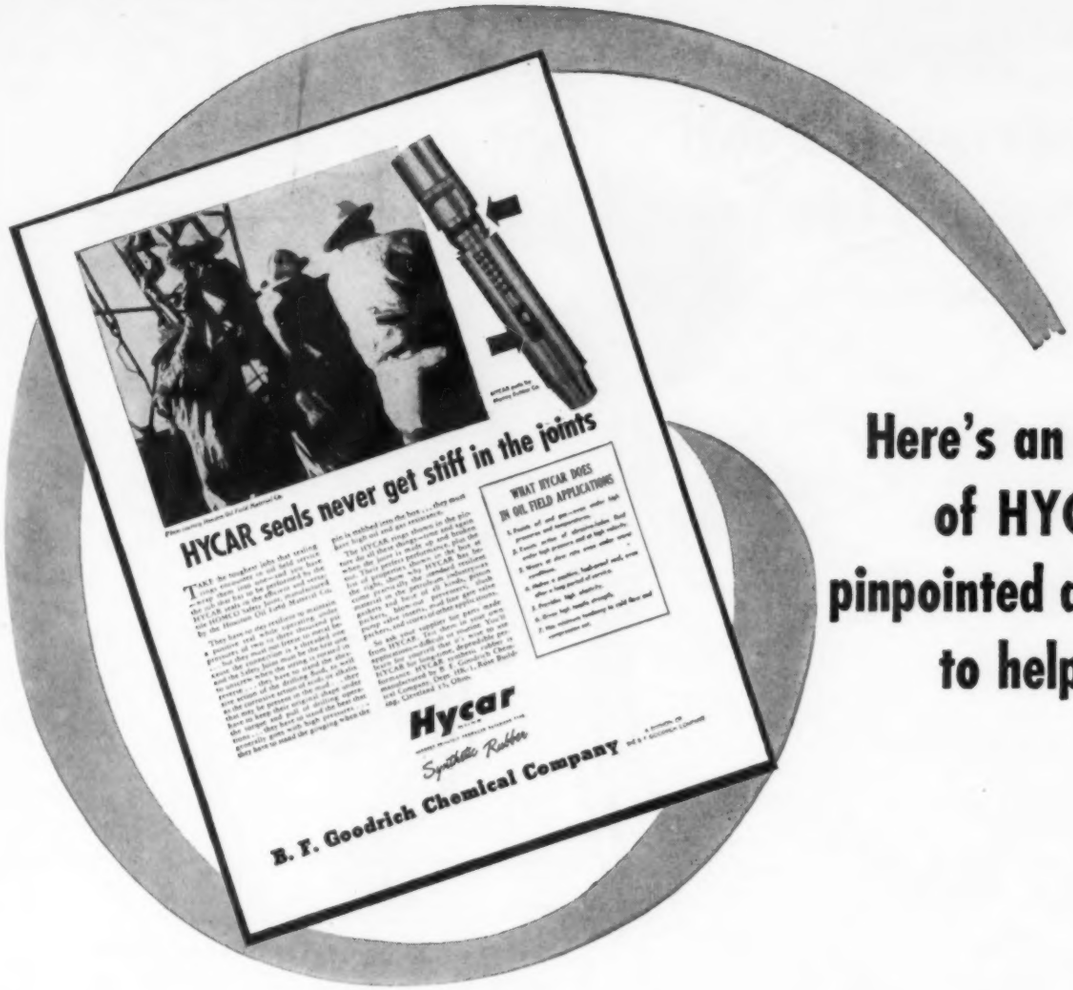


* Cut 0.1" long made in center groove of sample. Flexed on DUPONT flexer at 70° C. Unaged samples measured after 6 hrs. — Aged samples after 2 hrs.

Buy Victory Bonds

DU PONT
BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

THE RUBBER AGE, published monthly by The Palmerton Publishing Co., Inc., Printing Office, East Stroudsburg, Pa. Editorial and Advertising Offices at 250 West 57th Street, New York 19, N. Y. Entered as second class matter October 20, 1933, at the Post Office at East Stroudsburg, Pa., under the Act of March 3, 1879. Subscription in United States, $3.00 a year; Canada, $3.50; Foreign, $4.00. February, 1946. Vol. 58. No. 5.


HYCAR seals never get stiff in the joints
WHAT HYCAR DOES IN OIL FIELD APPLICATIONS
Hycar
Synthetic Rubber
B. F. Goodrich Chemical Company

Here's an example of HYCAR's pinpointed advertising to help you

THE advertisement shown here discusses an oil field application of HYCAR synthetic rubber. It appears only in petroleum publications—pinpointing that part of your market; going directly to people who will buy parts made from HYCAR.

It is typical of the specialized type of advertising that HYCAR is doing to reach all of your markets for HYCAR parts—automotive, aviation, engineering design, as well as a broad general audience.

It is our experience that this kind of advertising causes men throughout all industry to ask for parts made from HYCAR. It is our hope that it will encourage you and your sales staff to sell profitable *quality* parts instead of merely trying to meet low-price, low-profit competition.

These three helps will make it easier for you to sell parts made from a *superior* material:

. . . High quality special purpose synthetic rubbers.

. . . Technical aid in compounding problems.

. . . A strong national advertising campaign directed to *your* prospects.

Reprints of all HYCAR advertisements for use by your salesmen are yours for the asking. For reprints, more information about HYCAR, or for help with your problems, please write Dept. HD-2, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

Hycar

Reg. U. S. Pat. Off.

LARGEST PRIVATELY PRODUCED BUTADIENE TYPE

Synthetic Rubber

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY

It's as easy as that...

with Philblack A!

EASY PROCESSING, that's what we mean! Faster, smoother tubing —lower loadings—no mold cooling (at 200°F, better tensile strength than EPC!) Yes, even just a little Philblack A added to your other blacks makes a demonstrable difference both in processing . . . and in the finished product.

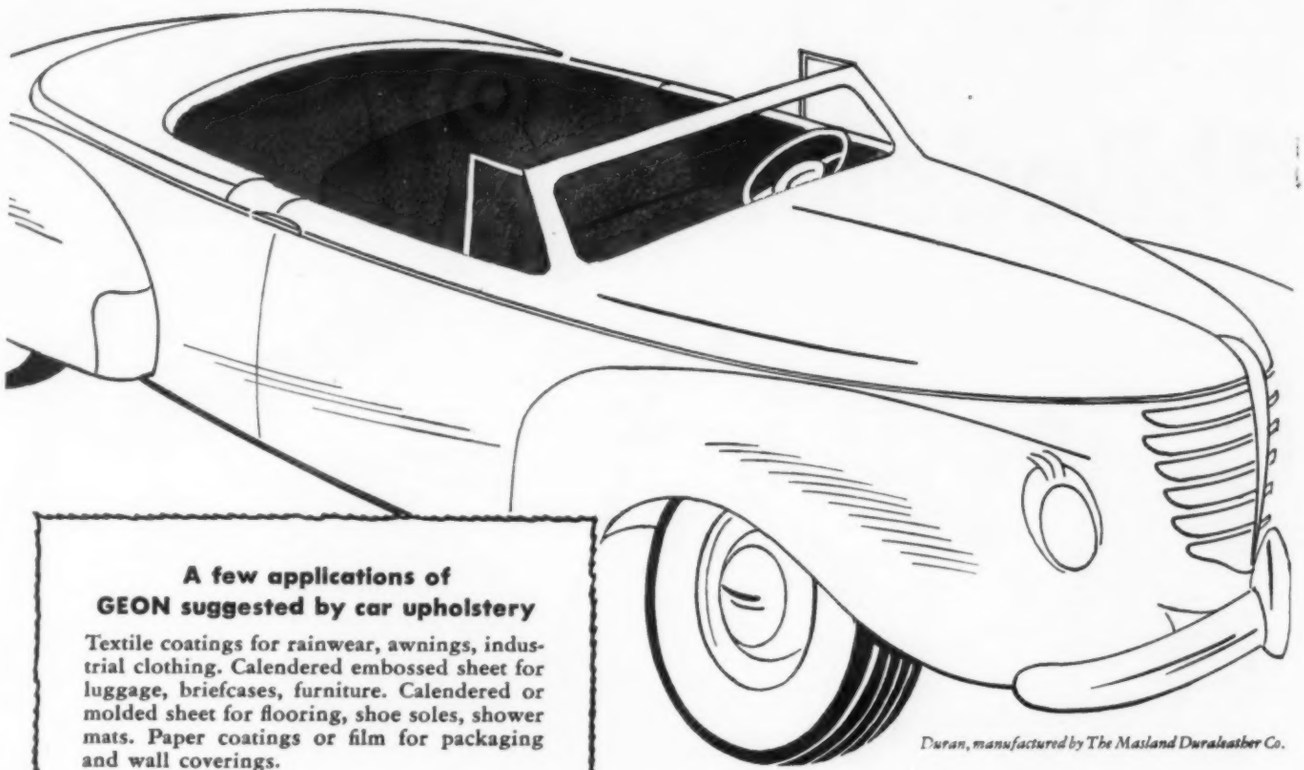
For increased resilience, for better resistance to cuts, cracks and abrasion, more and more rubber manufacturers are using Philblack A. If you are not now using this better black, send in your trial order today!

PHILLIPS PETROLEUM COMPANY

Philblack Division

EVANS BANK BLDG. AKRON, OHIO

Geon ...
for converting a convertible's upholstery



Duran, manufactured by The Masland Duraleather Co.

A few applications of GEON suggested by car upholstery

Textile coatings for rainwear, awnings, industrial clothing. Calendered embossed sheet for luggage, briefcases, furniture. Calendered or molded sheet for flooring, shoe soles, shower mats. Paper coatings or film for packaging and wall coverings.

Modern, weather-resistant seating suggests uses for GEON raw materials in every industry

Convertibles of the future—as well as standard passenger models, planes, trains, and buses—will feature new materials for seating, interior trim, and tops; materials made from or treated with GEON polyvinyl resins. Performance-proved in conclusive tests, these new materials have many definite advantages over anything previously used. And the properties that make GEON superior for this purpose suggest uses in every industry and every home.

For example, upholstery material properly made from GEON will resist the effects of weather, aging, sunlight, rain, and flexing indefinitely. It won't crack or get gummy even after prolonged exposure. It's easy to clean with soap and water. It resists foods and chemicals of all kinds—even strong acids have no effect. It's mildew-proof—fungi simply can't penetrate the surface. It will wear indefinitely—won't even show signs of severe usage and scuffing. It can be brightly or delicately colored for beautiful appearance.

These and other properties may be had in any number of combinations designed to meet specific service conditions. And GEON can be processed in many different ways—injection or compression molded, calendered or cast into sheet or film, calendered or spread into thin or heavy coatings for textiles and papers of all kinds. All this means that the *established and potential applications for GEON in every field are literally limitless.* For more information about GEON raw materials please write Dept. K-2, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

Geon
Polyvinyl Materials

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY

Yes....

Philadelphia Reclaim

is Good!

★ For some months in these pages we've been saying that Philadelphia reclaim has an important place in American industry—because for many purposes it is the most economical compounding material that can be found; stable and dependable; compatible with natural and synthetic rubbers.

Industry in general must agree with our statements — for right now *there just isn't enough Philadelphia reclaimed rubber to meet the enormous demand.*

Our apologies won't do you any good. So instead of apologizing we'll pledge ourselves to produce every pound of Philadelphia reclaim that it's in our power to produce—and fast.

Peak demand should be reached soon, and that will give us a chance to catch up. So please be patient. And don't forget what you already have learned — that Philadelphia reclaim is *good.* B. F. Goodrich Chemical Company, Dept. BB-2, Rose Building, Cleveland 15, Ohio.

PHILADELPHIA
RECLAIMED RUBBER

ANNOUNCING:

Bunac

REG. U. S. PAT. OFFICE

A NEW ACTIVATOR FOR GR-S

...**BUNAC** gives you Improved Cut-Growth Resistance— *without* Increased Heat Build-Up

W
-C=C-
REG. U. S. PAT. OFFICE

WILMINGTON

CHEMICAL CORPORATION

10 EAST 40TH STREET • NEW YORK 16, N. Y.

For technical data please write Dept. RB-2

B. F. Goodrich Chemical Company

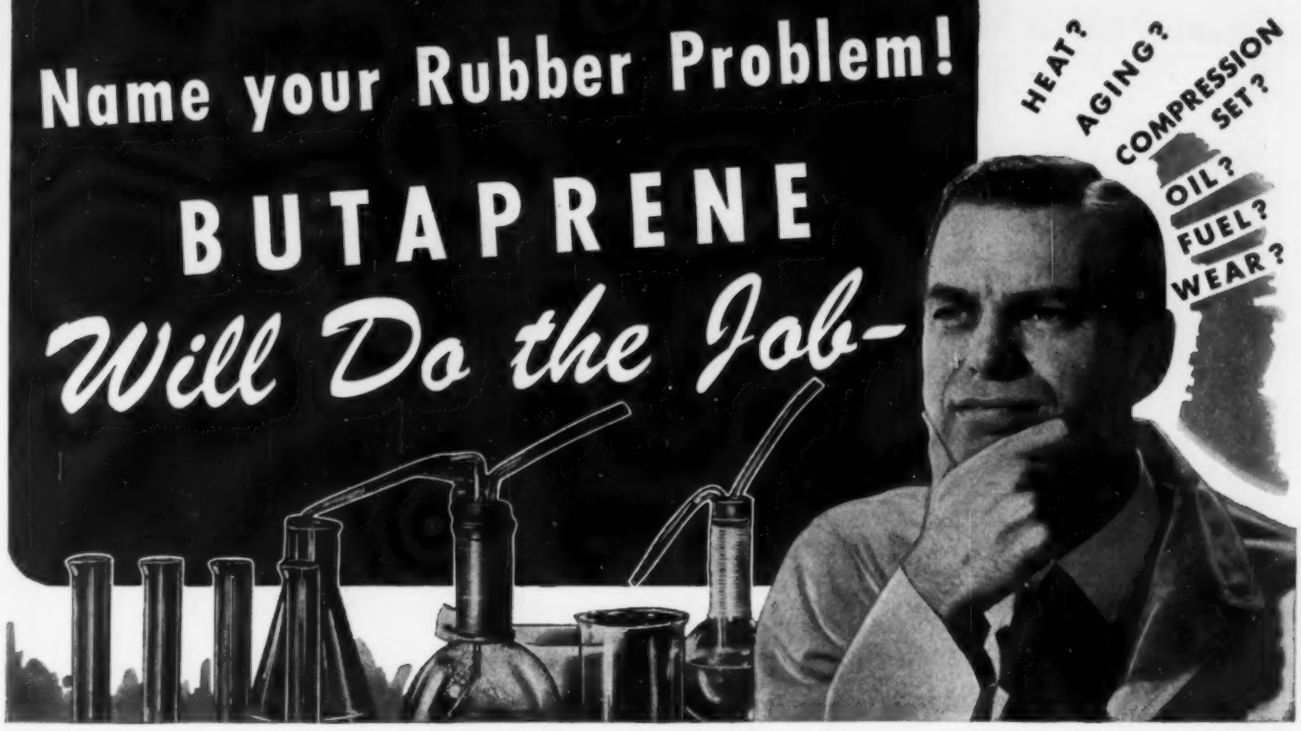
A DIVISION OF
THE B. F. GOODRICH COMPANY

ROSE BUILDING, CLEVELAND 15, OHIO

Name your Rubber Problem!

BUTAPRENE

Will Do the Job-



WANT a rubber that doesn't swell or soften in oils or fuels, and with low compression set, too — a rubber that's ideal for gaskets, sleeves, packings, diaphragms, and other oil-immersed parts? Just specify Butaprene NXM! Is flexibility at sub-zero temperatures your problem? Or blistering heat? There are Butaprene polymers that perform perfectly at minus 70° Fahrenheit, or at 300°. You'll find these new Butaprene Synthetic Rubbers remarkably versatile. They're more resistant to abrasion than natural rubber, have high tensile strength, good elongation. And as a *plus value* — all Butaprene N-type polymers are available in non-staining and non-discoloring types.

Why not find out what these remarkable new Butaprene polymers will do for you? For *expert* advice and assistance on *any* rubber problem, simply write Butaprene Technical Staff, XYLOS RUBBER COMPANY, Akron 1, Ohio.

•

For the best in music listen to the "Voice of Firestone" over N. B. C. Network

BUTAPRENE N *by* Firestone

THE SYNTHETIC RUBBER OF A THOUSAND USES

***Resists* · OIL · GASOLINE · HEAT · SUB-ZERO COLD · AGING · ABRASION**

Copyright, 1946, The Firestone Tire & Rubber Co.

SPHERON 9

Throughout the war, Cabot Spheron 9 Carbon Black remained at the same high levels of quality that had been originated in peacetime. Hard work and great care were necessary to make this statement possible . . . . to maintain the same easy processing characteristics which had made Spheron 9 a standard even years before Pearl Harbor.

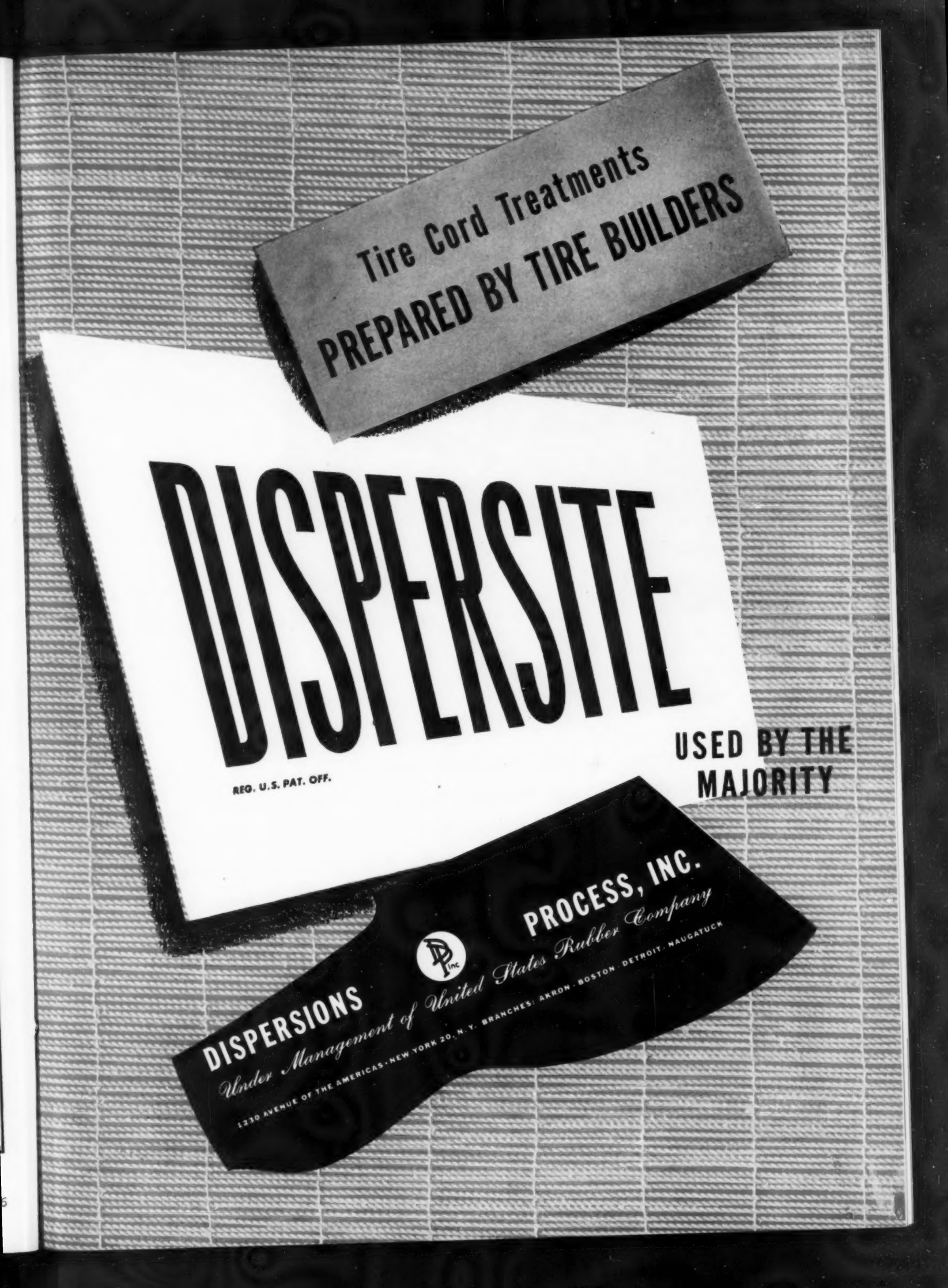
When the source of natural rubber was cut off and GR-S came in, the Cabot Company's Spheron 9 proved to be an EPC Black that could be depended upon . . . . proved itself unfailingly reliable.

For even in the wartime rush to produce more Carbon Black, there was no sacrifice of Cabot quality.

Cabot Spheron 9 was a dependable channel black throughout the war. It is the same EPC black today. It continues to help the rubber compounder fight the battle against heat generation in GR-S.

Godfrey L. Cabot, Inc.
77 Franklin Street
Boston 10, Mass.

CABOT


Tire Cord Treatments
PREPARED BY TIRE BUILDERS
DISPERSITE
REG. U.S. PAT. OFF.
USED BY THE MAJORITY
DISPERSIONS
PROCESS, INC.
Under Management of United States Rubber Company
1230 AVENUE OF THE AMERICAS · NEW YORK 20, N.Y. BRANCHES: AKRON · BOSTON · DETROIT · NAUGATUCK

TOM, WILL THIS GASKET STAND UP UNDER THE ACTION OF HOT SOLVENTS AND GREASES AND ALSO BE NON-STAINING?
ABSOLUTELY, SKIPPER; WE SPECIFIED EXTRA CLEAR PELLETEX
DETAIL ACTUAL SIZE

Compounds with PELLETEX and GASTEX, the leading semi-reinforcing furnace blacks, are easy to process with both natural rubber and synthetics, and are particularly resistant to the destructive action of alkalies, acids and solvents. PELLETEX, the pellet form of GASTEX, is now available in any desired quantity.

MANUFACTURER • DISTRIBUTOR

GENERAL ATLAS CARBON CO.

PELLETEX

GASTEX

PAMPA, TEXAS · GUYMON, OKLA.

HERRON BROS. and MEYER

NEW YORK, N.Y. AKRON, OHIO

RUBBER H AND M PIGMENTS Chemicals

When it rains, it pours . . .

RAINWEAR CUSTOMERS

. . . customers who are as particular as they are many . . . customers who want better raincoats, better rainhoods, better umbrellas. And making those *better* rainwear products, depends on the use of a *better* coating.

SYNTRON coating is a superior coating because it is (1) 100% *waterproof;* (2) *soft* and *flexible;* (3) *abrasion-resistant;* (4) *resistant* to *acids, alkalis* and *chemicals;* (5) *resistant* to *oils* and *greases;* and (6) *tough* and *durable.* These outstanding qualities have been tested on battlefields . . . have been *proved* on raincoats and ponchos for our armed forces.

Or, if you have a Special Coating Problem . . .

Gordon-Lacey research laboratories can develop a custom-made SYNTRON coating to fit your individual needs . . . a coating that is exactly right for your particular requirements, whether for cotton, rayon, nylon, fiberglass or any other fabric surface . . . and whether you service RAINWEAR, SHOE, HOUSE FURNISHINGS, CLOSET ACCESSORIES, SPORTWEAR, TOY or any other trade.

Send us the story of your coating problem. WRITE DEPT. RAF

GORDON-LACEY CHEMICAL PRODUCTS CO.

57-02 48th STREET • MASPETH, NEW YORK

PARAPLEX G-25

gives you these 9 advantages in vinyl resin compounds

1. PERMANENCE: The extremely low volatility of PARAPLEX G-25 approximates that of polyvinyl chloride itself. Because softness and thermoplasticity of this synthetic resin are not affected by aging or exposure, PARAPLEX G-25 plasticized compounds are truly permanent, even under most rigorous conditions.

2. LOW FLAMMABILITY: Plastics or plastic coatings made with PARAPLEX G-25 do not support combustion ...are therefore particularly well suited for fabrics and electrical insulation where fire-resistance is a prime requisite.

3. FLEXIBILITY AT LOW TEMPERATURE: Vinyl resins plasticized with PARAPLEX G-25 show low temperature flexibility adequate for all uses except the most highly specialized applications. The bend-brittle point of such stocks compares favorably with most ester type plasticized compounds.

4. HEAT STABILITY: PARAPLEX G-25 compounds show unusually low heat deformation and excellent retention of original flexibility...will not degrade the vinyl resins even at high temperatures.

5. NON-EXTRACTABILITY: PARAPLEX G-25 is insoluble in oils, fats, water and aliphatic hydrocarbons, making it possible for the first time to compound soft, flexible polyvinyl chloride stocks with excellent oil resistance.

6. NON-MIGRATABILITY: PARAPLEX G-25 does not spue or migrate from vinyl resin compositions at either high or low temperatures, an important consideration where freedom from lifting and the ultimate in adhesion are required.

7. FREEDOM FROM ODOR AND TASTE: Because this resinous plasticizer imparts no odor or taste to coating compounds, it is eminently suitable for food packaging, processing equipment, rainwear and wearing apparel, as well as other special applications where these qualities are essential.

8. RESISTANCE TO WEATHERING. PARAPLEX G-25-vinyl compounds are unaffected by heat, cold, sunlight or ultra violet. Even after long exposure, flexibility remains unimpaired.

9. EASE OF COMPOUNDING AND PROCESSING: PARAPLEX G-25 may be compounded readily in a Banbury or on a rubber mill at milling temperatures only slightly higher than for monomeric ester type plasticizers. Extruding and calendering operations produce stocks with particularly smooth finish, and high gloss surfaces.

No other plasticizer or plasticizer combination produces the outstanding effects obtained with PARAPLEX G-25. Be sure to investigate the merits of this radically new vinyl plasticizer. Detailed information will be sent promptly upon request. Send your inquiries to — The Rubber Chemicals Department, The Resinous Products & Chemical Company.

PARAPLEX *is a trade-mark, Reg. U. S. Pat. Off.*

THE RUBBER CHEMICALS DEPARTMENT

THE RESINOUS PRODUCTS & CHEMICAL COMPANY

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

The roof on the right, insulated with PC Foamglas, is insulated for good. No fear of a replacement job such as is shown above.

This won't happen here

YOU DON'T have to figure on repairs and replacement when you insulate your roof with PC Foamglas. For this strong, rigid material resists attack by elements that cause other materials to lose insulating efficiency. Made of millions of air-filled glass cells, PC Foamglas helps to maintain temperature and humidity levels, to prevent condensation, permanently.

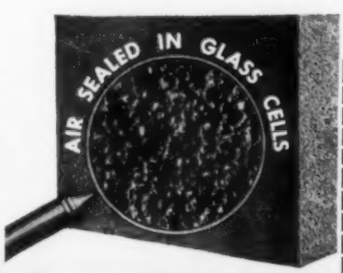
When you need roof insulation, you need a material that is moistureproof, fireproof, vaporproof, verminproof and impervious to most acids. It is conveniently packaged, easily handled, quickly installed.

Only with PC Foamglas do you get all these advantages. Even a break in the roofing felt that exposes the material to rain or melting snow will not cause PC Foamglas to rot, check, warp, swell or shrink. In addition it forms such a firm, even base for roofing felt that such breaks rarely if ever occur.

FIRST COST IS LAST COST

When you are figuring on insulation for roofs, floors, walls, tanks or plant equipment, learn why the most efficient, the most economical material is PC Foamglas. Check your choice of the illustrated booklets on PC Foamglas Insulation on the convenient coupon and mail it today to Pittsburgh Corning Corporation, 632 Duquesne Way, Pittsburgh 22, Pa.

· Also makers of PC Glass Blocks ·



Pittsburgh Corning Corporation
Room 107, 632 Duquesne Way
Pittsburgh 22, Pa.

Dear Sirs:

Please send along my *free* copies of the booklets I have checked. It is understood that I incur no obligation.

Roofs_____ Walls_____ Floors_____

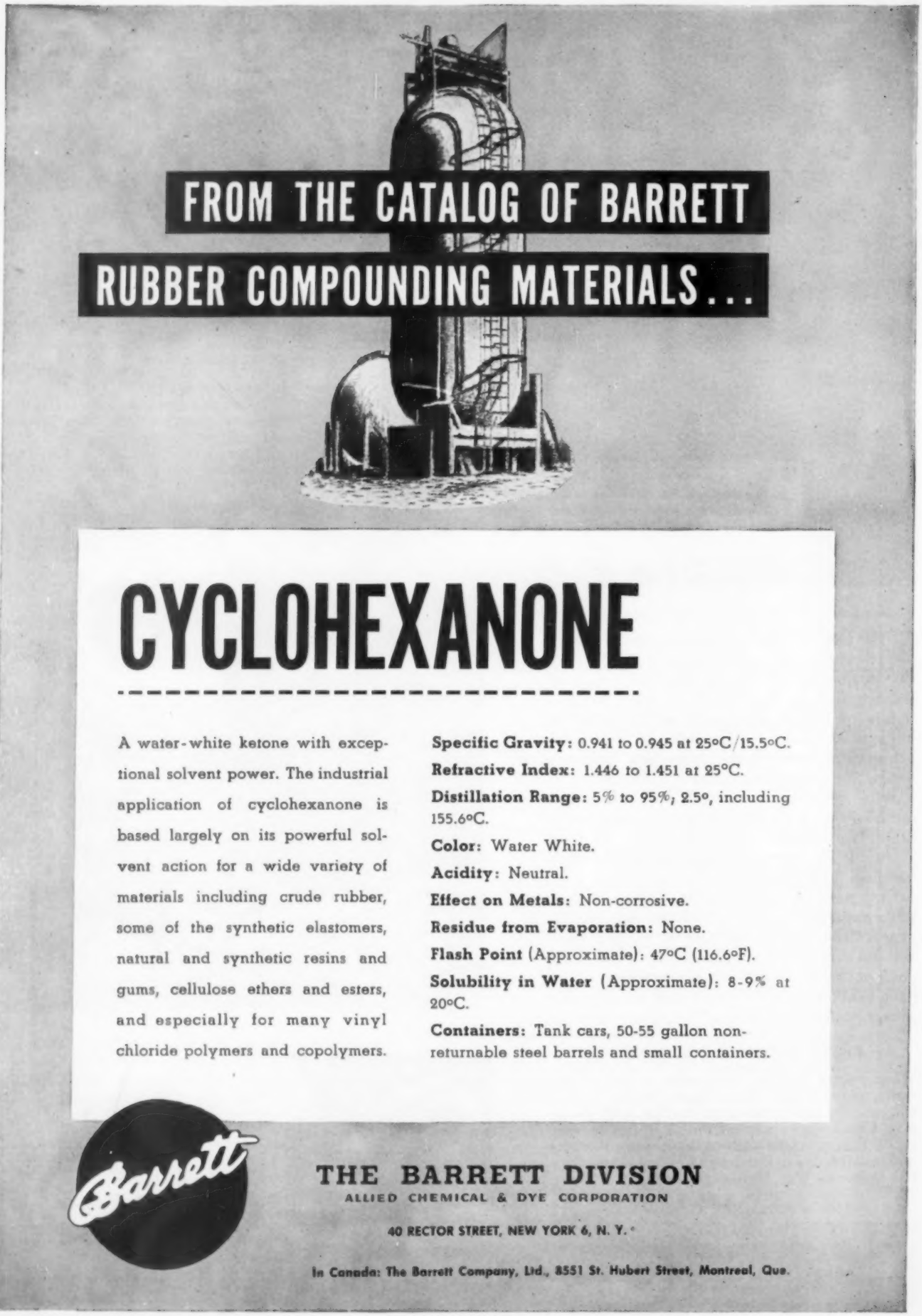
*Name*_____

*Address*_____

*City*_____ *State*_____

PC FOAMGLAS *Waterproof Fireproof* **INSULATION**

T. M. REG. U. S. PAT. OFF.



CYCLOHEXANONE

A water-white ketone with exceptional solvent power. The industrial application of cyclohexanone is based largely on its powerful solvent action for a wide variety of materials including crude rubber, some of the synthetic elastomers, natural and synthetic resins and gums, cellulose ethers and esters, and especially for many vinyl chloride polymers and copolymers.

Specific Gravity: 0.941 to 0.945 at 25°C/15.5°C.

Refractive Index: 1.446 to 1.451 at 25°C.

Distillation Range: 5% to 95%, 2.5°, including 155.6°C.

Color: Water White.

Acidity: Neutral.

Effect on Metals: Non-corrosive.

Residue from Evaporation: None.

Flash Point (Approximate): 47°C (116.6°F).

Solubility in Water (Approximate): 8-9% at 20°C.

Containers: Tank cars, 50-55 gallon non-returnable steel barrels and small containers.

Barrett

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION

40 RECTOR STREET, NEW YORK 6, N. Y.

In Canada: The Barrett Company, Ltd., 8551 St. Hubert Street, Montreal, Que.

The 100 rubber parts illustrated at right represent a typical turbojector molding. Each part is 27/32" dia. with 31/32" dia. flange. Overall length—1-3/32". Hole through center —15/32" dia. Total weight of shot 2-1/2 lbs. Cure time—1-1/2 minutes. Injection time—1-1/4 minutes. Total cycle time—4-1/2 minutes. Molder—Acushnet Process Company.

THE H-P-M TURBOJECTOR

FOR INJECTION MOLDING OF RUBBER

This new revolutionary injection machine is designed for production molding of both natural and synthetic rubber. Injection capacities as high as eight pounds per cycle have been secured.

Actual production results have proven that rubber parts molded with the H-P-M Turbojector have better physical properties, longer life and greater tensile strength than those molded by conventional compression methods.

The H-P-M Turbojector has greatly reduced production costs. For example, preforms are not required. Mold is filled automatically. Curing time has been greatly reduced, and in some cases as much as 93%. Due to elimination of flash, finishing operations have also been reduced to an absolute minimum.

The H-P-M straight-line hydraulic mold clamp insures positive sealing of mold halves. Entire machine is fully automatic, requiring little manual effort. H-P-M pumps, valves and controls are employed for all hydraulic actions. Investigate this new revolutionary injection molding machine. Write today for H-P-M Bulletin 4601.

The Hydraulic Press Mfg. Co.
Mount Gilead, Ohio, U. S. A.
Branch Offices in New York, Philadelphia, Cleveland, Detroit and Chicago. Representatives in other principal cities.

HPM

REVOLUTIONIZING

TURBOJECTOR
MOLDING MACHINE

PRODUCTION WITH HYDRAULICS SINCE 1877

IN HANDLING

SCRAP RUBBER

WE FOLLOW THE BOOK

ex-pert (ĕks-pûrt'), *adj.* skilful; adroit; dexterous:—*n.* (ĕks'pûrt), one who is skilled or thoroughly informed in any particular kind of knowledge or art; a specialist.

[1]serv-ice (sûr'vĭs), *n.* **1,** the act or occupation of working for another; the rendering of any labor, office, or duty to another; **2,** often in *pl.*, the work done for another; duty required or performed in any office; employment, aid, or kindness rendered to another; **3,** the manner of performing work,

Since the beginning of the rubber reclaiming industry our business has been, primarily, the supplying of scrap rubber, expertly sorted and delivered according to specifications. This "know how" is particularly vital today with the mixture of natural and synthetics in scrap. We know the difference.

THE LOEWENTHAL CO.

Established 1868

JACK SIDER, *President* J. K. McELLIGOTT, *Exec. Vice-Pres.*

We Solicit Your Inquiries

188 W. RANDOLPH STREET
CHICAGO 1, ILL.

159 CLEWELL STREET
AKRON 5, OHIO

Cable Address: "Gyblowell"

BAKER
PLASTICIZERS

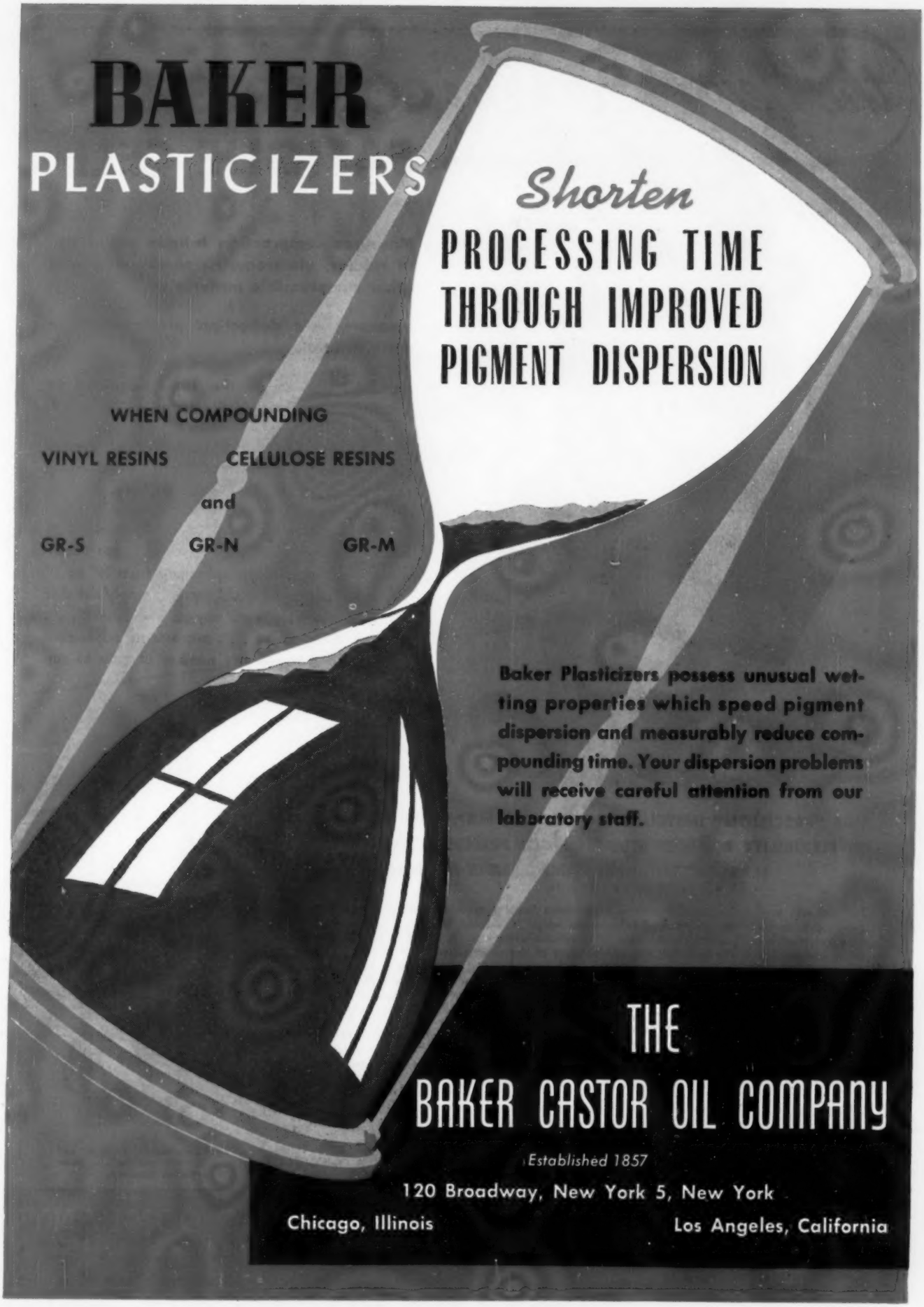
Shorten
PROCESSING TIME THROUGH IMPROVED PIGMENT DISPERSION

WHEN COMPOUNDING

VINYL RESINS CELLULOSE RESINS

and

GR-S GR-N GR-M



Baker Plasticizers possess unusual wetting properties which speed pigment dispersion and measurably reduce compounding time. Your dispersion problems will receive careful attention from our laboratory staff.

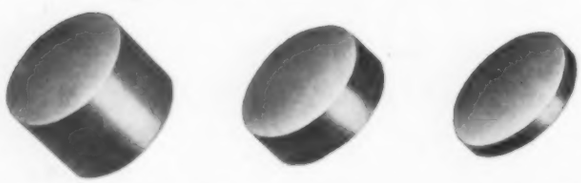
THE BAKER CASTOR OIL COMPANY

Established 1857

120 Broadway, New York 5, New York

Chicago, Illinois Los Angeles, California

the New "Precision" COMPRESSION FATIGUE CELL



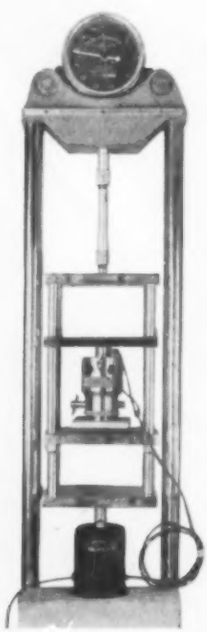
- **Measures compression fatigue properties of rubber, elastrometric compounds, and other compressible materials.**
- **Measures the deflection produced by a definite load.**
- **Used to determine the load required to produce a definite deflection.**
- **For testing the compressibility of materials used for motor and machinery mountings, gaskets, packings, etc.**

Extremely accurate . . . reproducible results . . . instant determinations . . . no calculations necessary . . . accommodates specimens from ⅛" to 1" . . . not necessary to mold sample, simply cut disc of 1.129 diameter from any slab or sheet . . . barrel locking device . . . micrometric adjustment . . . possible to use any number of cells to run tests simultaneously.

THIS "PRECISION" INSTRUMENT PROVIDES MAXIMUM MOBILITY AND FLEXIBILITY FOR THE STUDY OF COMPRESSION BEHAVIOR OF ELASTOMETRIC AND COMPRESSIBLE MATERIALS

The test cell, used in conjunction with a compression loading machine, permits observation of the progressive decrease in the amount of pressure which is exerted by a test specimen 1.129" in diameter, that is held under compression at a definite deflection. A specimen may be held intact under compression in the test cell, and independent of the compression machine, for any extended period of time. The cell is a separate integrated compression device which is removed from the machine after the compression reading is observed, and may be placed in a heating or aging oven, or subjected to sub-zero temperatures and the compression fatigue properties then measured, after the rubber or elastomer is subjected to these conditions.

The cell units are so designed that a number of them can be used in order to increase the volume of work which can be handled. Any number of cells may be used with one compression testing machine. These cells are removed from the machine immediately after the initial compression load is determined, thus permitting the use of the compression machine for other testing purposes. This cell is durably constructed of stainless steel, and all parts are machined to extremely close tolerances. Micrometer graduations are inscribed on the barrel and on the sleeves to permit adjustments in thousandths of an inch. **Write for descriptive Bulletin No.** 10052-K



Compression Fatigue cell in test position in compression machine.

See Your Laboratory Supply Dealer

PRECISION SCIENTIFIC COMPANY
1736-54 N. Springfield Ave., Chicago 47, U.S.A.
Engineers and Builders of Scientific Apparatus and Production Control Laboratory Equipment for Almost a Quarter Century

PRODUCT QUALITY

PRODUCT RESEARCH

PRODUCT SERVICE

THE "Big 3" AT CYANAMID

AERO* Brand	Acrylonitrile DOTG and DPG Dibutyl-Phthalate Rubber Sulphur Casein
ACCELERATOR #49**	Accelerator for natural rubber and activator for primary accelerators for GR-S.
AERO** AC 50	Delayed action activator for the thiazole type of accelerators
AERO** AC 165	Self activating accelerator for GR-S
K & M	Magnesium Oxide Magnesium Carbonate
AEROSOL*	Wetting Agents

WHEN PERFORMANCE COUNTS... CALL ON CYANAMID

SALES REPRESENTATIVES TO THE RUBBER INDUSTRY AND STOCK POINTS: Akron Chemical Company, Akron, Ohio. Ernest Jacoby & Company, Boston, Mass. • Herron & Meyer, Chicago, Ill. • H. M. Royal, Inc., Los Angeles, Calif. • H. M. Royal, Inc., Trenton, N. J.

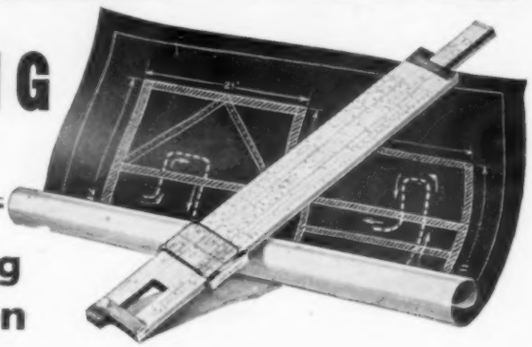
American CYANAMID & Chemical Corporation

(A Unit of American Cyanamid Company)

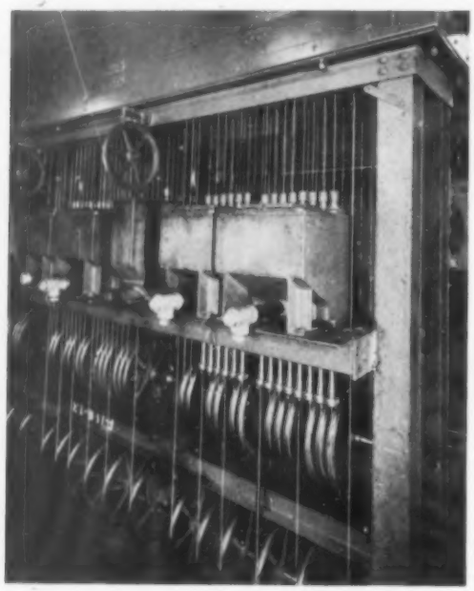
30 ROCKEFELLER PLAZA · NEW YORK 20, N. Y.

*Reg. U. S. Pat. Off. **Trade-Mark

OVEN ENGINEERING NEWS



Country's Largest Strand Coating System Features Constant Tension and Variable Speed Handling



Right: Multi-coat coating system showing arrangement of coating pot and driving sheaves.

THE coating equipment shown on this page, designed and built by **IOE** engineers, is the biggest installation of its type in the country, having a total capacity of 40,000,000 feet of production per month through 21 consecutive continuous resin coats. In designing and building this equipment the previous processing time of several hours for a complete operation was reduced to minutes, effecting a tremendous saving in time and money.

This equipment not only makes 21 consecutive coats or dips continuously and at very high speeds but is capable of applying many different types of coatings, including lacquers, varnishes, solvent resins, water dispersed resins, and latex, through any number of coats up to and including twenty-one.

The intermittent high speed drying between successive coats is accomplished by direct gas fired convection heater units which are designed to handle highly explosive solvents or plasticizers.

This particular equipment handles eight consecutive ends which operate independently of each other although having a common drying unit. Speeds are independently variable and depend on the material, the type of coating and the diameter of the cord being processed. Each end of the cable or cord is equipped with its own constant tension variable speed takeup unit.

An installation such as this has a wide number of uses, being capable of processing wire, cord, cable, rope and other continuous filament materials of similar cross section within wide limitations of size, material and process.

All types of finishes, either organic or inorganic, water soluble or solvent soluble, can be applied at high speeds and with accurate coating build-up.

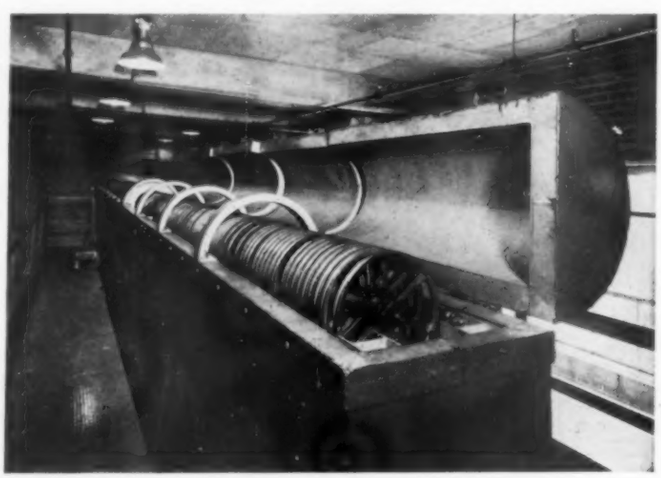
This type of high speed coating equipment is typical of many special duty installations we have made. We have likewise designed and built a number of similar systems that have proven unusually economical to operate because they have always been rigidly engineered with an eye to operating and maintenance economies and to exact processing requirements.

You'll Find These Useful

For the last four months, our advertisements have been describing different types of recent installations we have made. These and a copy of "Lacquering of Insulated Wire and Cable" an easily comprehended description of the four basic types of continuous wire finishing systems, profusely illustrated, (a reprint of our 16-page article in *Wire and Wire Products,*) are available for your scrutiny and profitable study.

In the coming battle of costs, you cannot afford to be without such basic information. Send for this material today.

Below: Accessory sheaves make easy threading.



(This is No. 24-R of a series. Reprints of previous advertisements sent free upon request)

ENGINEERING VERSATILITY

THE INDUSTRIAL *Oven Engineering* COMPANY

13825 TRISKETT ROAD, CLEVELAND 11, OHIO

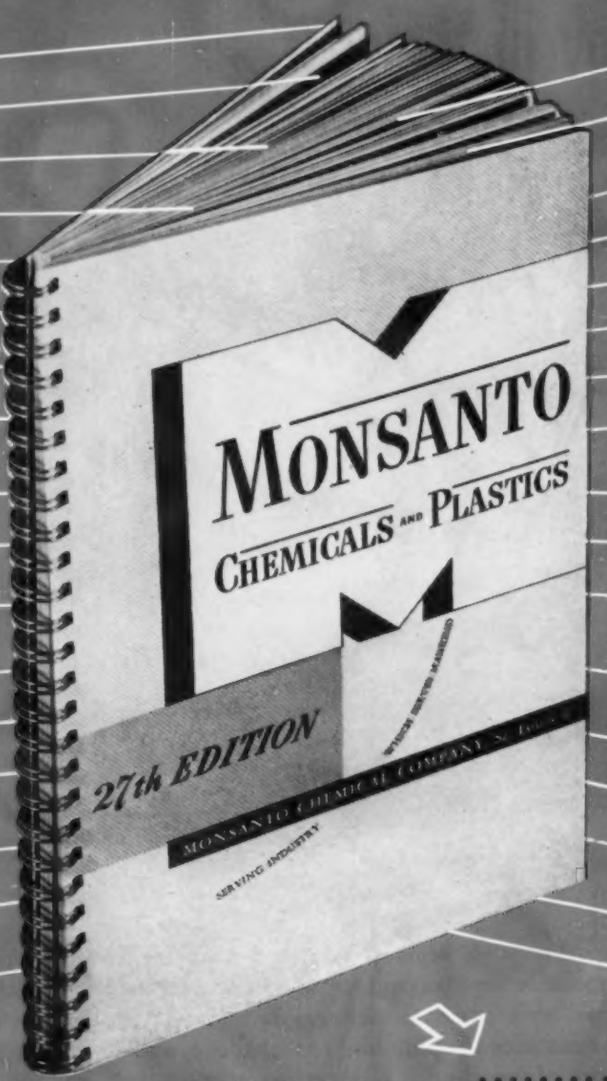
Engineering Representatives in Principal Industrial Areas

★ ASSOCIATED COMPANY: JAMES DAY MACHINERY LTD., LONDON, W. 1, ENGLAND ★

NEW and now available

AGRICULTURAL
APPLIANCES
AUTOMOTIVE
AVIATION
CARPETS AND RUGS
CERAMICS
CHEMICAL PROCESS
COSMETICS AND PERFUMES
DAIRY PRODUCTS
DENTAL PRODUCTS
DYESTUFF MANUFACTURE
ELECTRICAL
ENGRAVING
FLORISTS AND FRUIT GROWERS
FOOD
GLASS AND VITREOUS WARE
INSECTICIDES

LAUNDRY
LEATHER AND TANNING
LUMBER
METALS
MINING
OIL REFINING
PACKAGING
PAINT, VARNISH AND LACQUER
PAPER
PHARMACEUTICAL
PLASTICS AND SYNTHETIC RESINS
POWER AND POWER PLANTS
PRINTING INKS
RUBBER
SOAPS AND DETERGENTS
TEXTILES
WATER TREATMENT



If you are identified with any of the above 34 industries, this new and complete Monsanto Catalog should be on your desk . . . It contains 214 pages of valuable, detailed information on more than 400 Monsanto Chemicals and Plastics — a daily guide of definite help to everyone whose thinking is geared to increased production, greater economies, better methods and improved product salability . . . Send for your copy today . . . Fill in and mail the coupon, or write MONSANTO CHEMICAL COMPANY, 1700 South Second Street, St. Louis 4, Missouri.

FILL IN AND MAIL THE COUPON

MONSANTO CHEMICAL COMPANY
Department 27-A
1700 South Second Street
St. Louis 4, Missouri

Please send immediately copy of your new Monsanto Catalog to

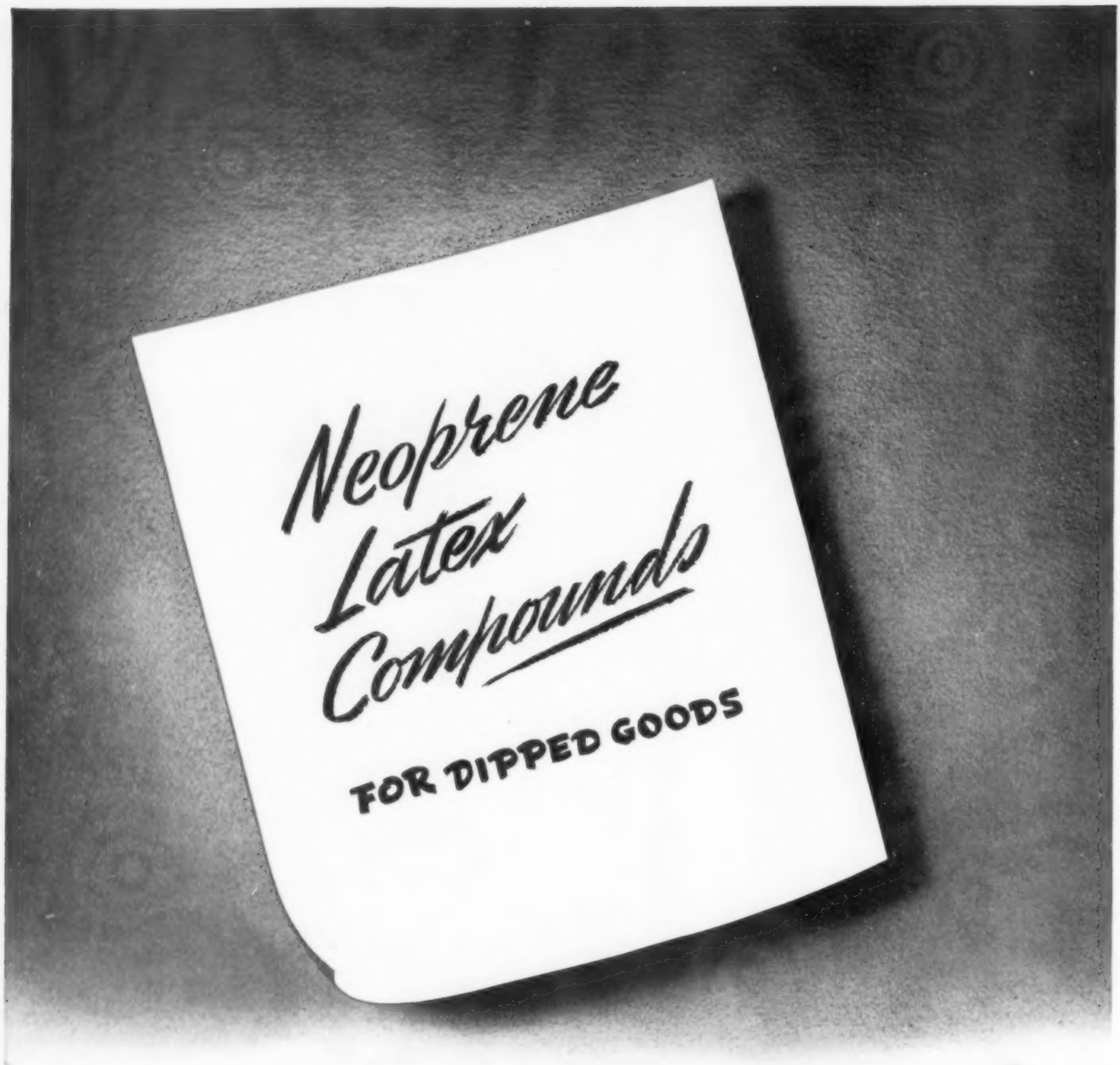
*Name*_____

*Title*_____

*Company*_____

*Street*_____

*City*_____ *Zone*____ *State*_____



General Latex has developed several simplified neoprene latex compounds for dipped goods. These compounds are thoroughly "tried and proven" and in current use in many factories. Neoprene latex offers advantages not found in natural rubber latex—more particularly, high resistance to oxidation, sunlight, oils, and chemicals. If you are considering the manufacture of any dipped product, we suggest that you get in touch with our technical staff. Their years of experience with natural and neoprene latex will prove very helpful in formulating a neoprene compound custom-made to your specific needs.

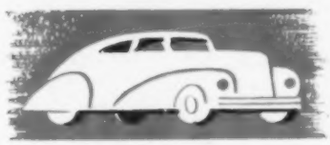
General Latex
& CHEMICAL CORP.
666 MAIN STREET, CAMBRIDGE, MASS.

Vultex Division — Verdun Industrial Buildings, Verdun, Montreal, Quebec

Agents for Rubber Reserve Company for storage and distribution of natural rubber latex. Distributors for Rubber Reserve Company for synthetic latex. Operators of the Government owned Baytown, Texas, synthetic rubber plant in collaboration with the General Tire & Rubber Co.

You'll see more of it...

You'll hear more of it...and you may

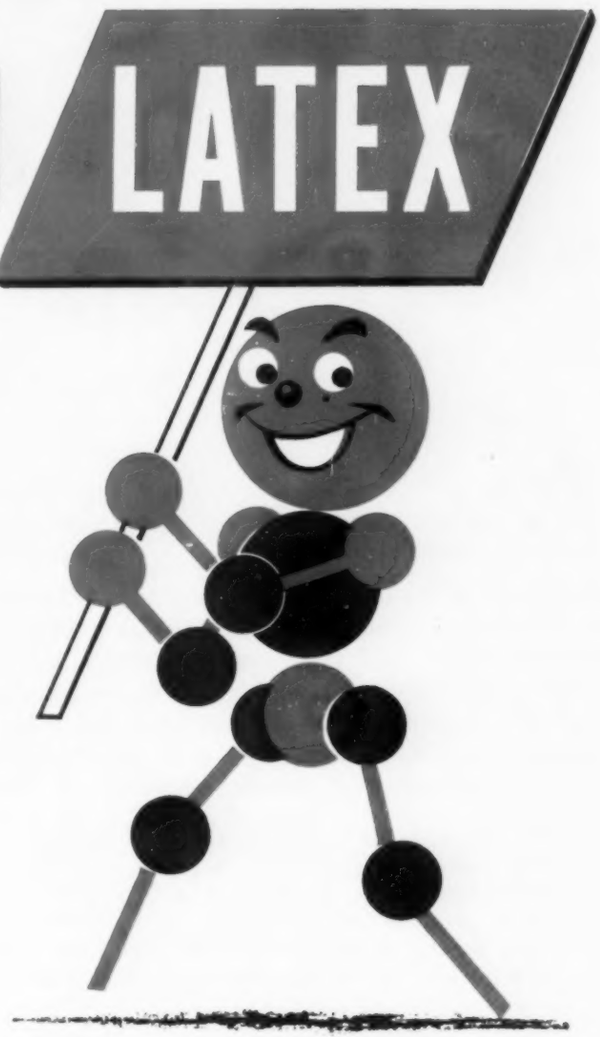
soon be  using it in your cars...

PERBUNAN LATEX

THE NEWEST PERBUNAN POLYMER!

Properties of Latex Type Perbunan	"G"	"H"
Color (Visual Observation)	Cream	Cream
Per cent Total Solids (Evaporation)	52	55
Per cent Dry Rubber Content	50	52.5
Per cent Ash (On Total Solids)	0.23	1.10
PH	9.7	9.4
Latex Density at 25°C	0.978	0.981
Surface Tension dynes per cm, at 25°C	40.8	37.0
Mechanical Stability*	2.2	0.1
Absolute Viscosity Centipoises at 26.5°C	10.6	12.9

*Determined by running on high speed Hamilton-Beach stirrer operating at 10,000 rpm for 3 minutes. Value expressed as per cent coagulate based on dry rubber content of sample.

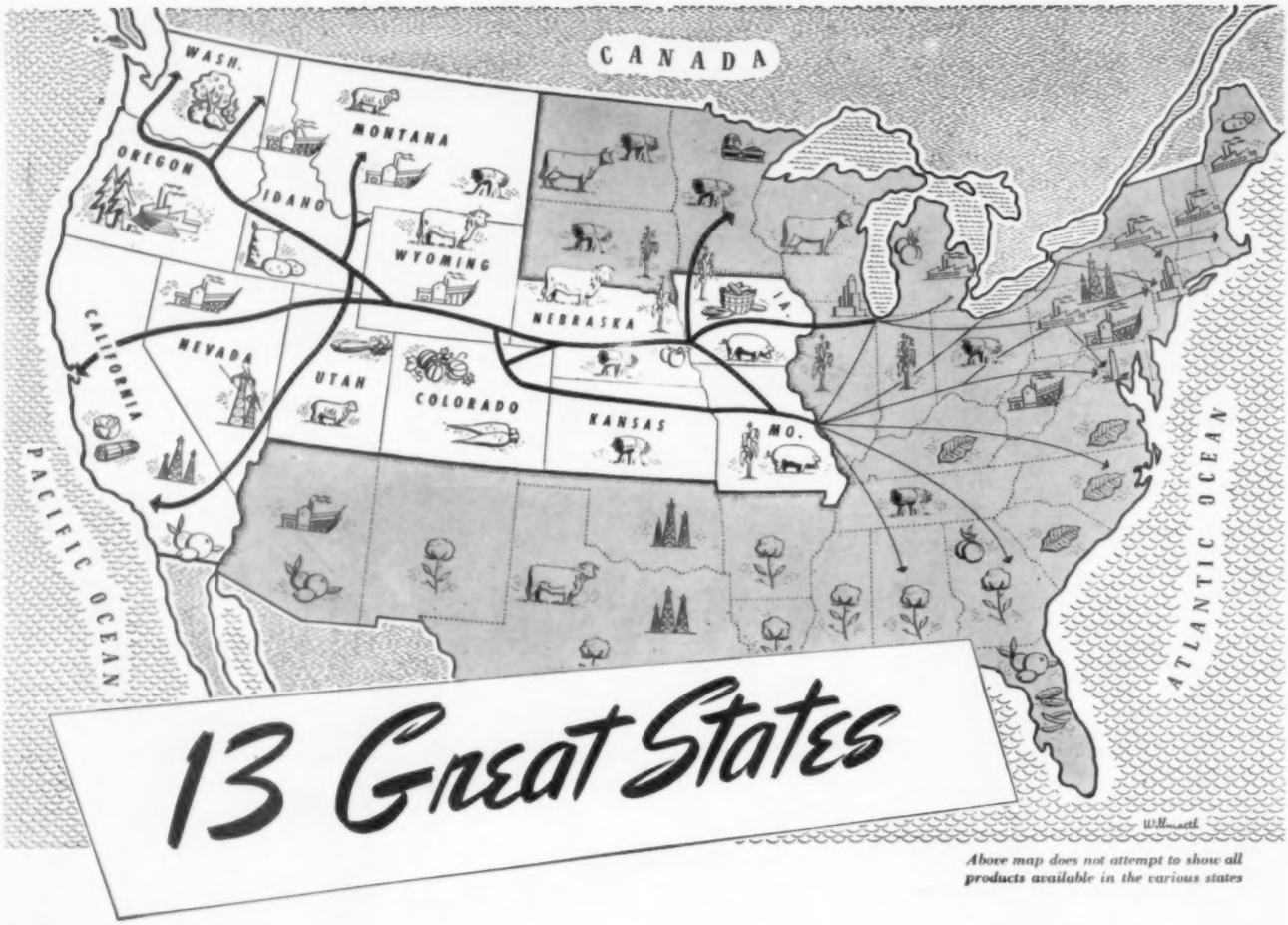


PERBUNAN
REG. U. S. PAT. OFF

THE SYNTHETIC RUBBER THAT RESISTS OIL, COLD, HEAT AND TIME

STANCO DISTRIBUTORS, INC., 26 Broadway, New York 4, N.Y.; First Central Tower, 106 South Main Street, Akron 8, Ohio; 75 East Wacker Drive, Chicago 1, Illinois. West Coast Representatives—H. M. Royal Inc., 4814 Loma Vista Avenue, Los Angeles 11, California. Warehouse stocks in New Jersey, Illinois, California and Louisiana.

Copyright 1946 by Stanco Distributors, Inc.



Above map does not attempt to show all products available in the various states

For more than 75 years, Union Pacific has served thirteen western states . . . been a partner in their development.

This vast fertile territory is more than the breadbasket of the nation. Due to its great wealth of industrial raw materials—ore, minerals, petroleum and lumber—it might also be called the nation's treasure-chest. Rivers have been harnessed—providing irrigation and power. And there is splendid rail transportation.

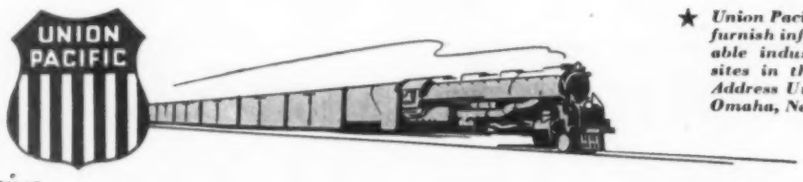
For example, in Nebraska, Kansas, California and practically all states in Union Pacific territory, the utilization of agricultural products by chemurgy has contributed greatly to the rubber industry. Union Pacific has the equipment and personnel to meet all the requirements of shippers in those regions.

These thirteen western states served by the railroad are ripe for postwar expansion. They have the materials, facilities and space.

Union Pacific will continue to play its part in the future progress of this western territory by providing unexcelled freight and passenger transportation over its Strategic Middle Route.

Be Specific—
say "Union Pacific"

★ *Union Pacific will, upon request, furnish information about available industrial and mercantile sites in the territory it serves. Address Union Pacific Railroad, Omaha, Nebraska.*



The Progressive

UNION PACIFIC RAILROAD

The Strategic Middle Route

"Pin-Up" for '46

HERE'S an appealing vision for millions of motorists. . . White side-wall tires with red tubes—hmm-m, a gorgeous set-up for any man's money! The real thing can soon replace the vision. Red tubes of Butyl rubber are here now, thanks to SILENE EF. . . Next is the white side-wall tire. . . And that, too, is a probable "come-back" in 1946. It also will be made possible by SILENE EF. . . This fine white reinforcing pigment is assuring greater success in color compounding. It is essential in many non-black compounds to give them needed processing qualities, and the good cured physical properties unobtainable when clays or whitings are used alone as the loading pigment.

SILENE EF

STANDARD Chemical Company

General Offices: AKRON 8, OHIO

New England: 335 Chamber of Commerce Bldg., Boston, Mass.
Mid-Atlantic: Broad Street Bank Bldg., Trenton, N. J.
Mid-West: 2724 W. Lawrence Ave., Chicago, Ill.

for **INSULATED WIRE**

Tensile strength

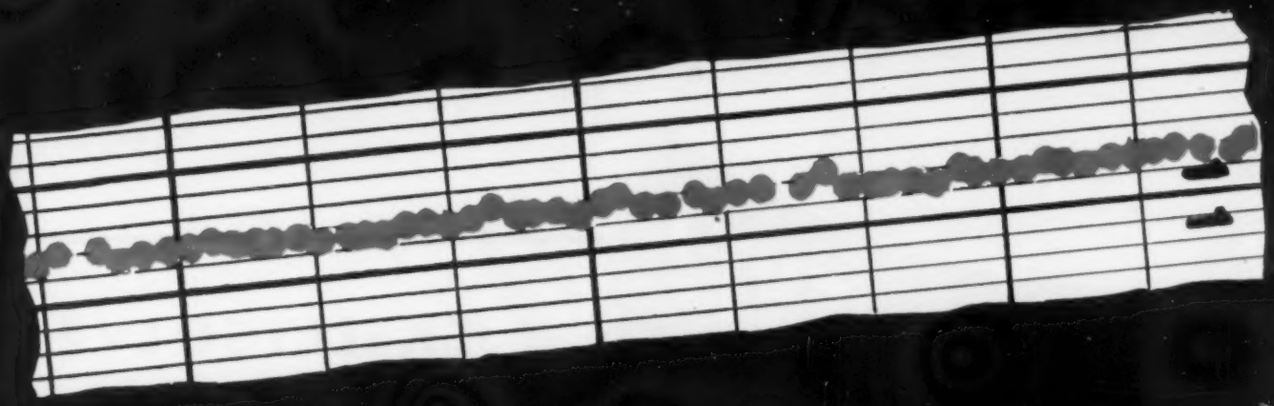
Resistance to aging

Dielectric strength

Write Our Technical Service Dept. for Details

MOORE & MUNGER

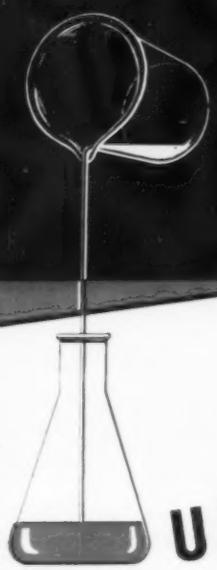
33 RECTOR STREET - NEW YORK CITY



Peace-time demands for NEOPRENE COMPOUNDED PRODUCTS

give new importance to CALCINED MAGNESIA

made under controlled temperature*



IT'S UNIFORM

1. UNIFORM wetting power and ease of dispersion
2. UNIFORM dispersion with improved stabilizing effect
3. UNIFORM quality maintained in moisture-proof packaging

"Give us more Neoprene compounded products." Every day the demand increases as war-time experience with Neoprene becomes known.

The sharp rise in the use of Neoprene for many new products makes it doubly important for Neoprene compounders to know the importance of selecting a uniform Calcined Magnesia.

And one vital factor in the uniformity of Calcined Magnesia is controlled temperature in manufacturing. Baker gives you this plus with specially built electric ovens. This electrically controlled calcining process gives definite uniformity and also eliminates possibility of oxide contamination from products of combustion.

The indexes of chemical purity for Calcined Magnesia are extremely high. The indexes for iron and calcium are extremely low. The processing of neoprene is still a very sensitive operation. That is why you will be interested in the distinctive features of Baker's Calcined Magnesia, shown in the panel.

We urge you to test Baker's Magnesium Oxide (Neoprene grade). Test it for its ease of dispersion—its ease of compounding of stock—its rate of cure — its tensile strength — and its plasticity. Learn why Baker's light Calcined Magnesia is better. Send for free samples.

J.T. Baker Chemical Co., *Executive Offices & Plant:* Phillipsburg, N.J.
***Branch Offices:* New York, Philadelphia, Boston and Chicago.**

Baker's *Light* CALCINED MAGNESIA

(MAGNESIUM OXIDE)

SKELLYSOLVE

for the RUBBER INDUSTRY

There are six different types of Skellysolve which are especially adapted to various uses in the rubber industry, for making rubber cements, and for many different rubber fabricating operations. Skellysolve offers many advantages over benzol, rubber solvent gasoline, toluol, carbon tetrachloride, etc. Our Skellysolve Technical Fieldmen have aided many manufacturers in developing formulas for new or improved products, and in "shooting" trouble of a solvents nature. Write or wire today for full information.

Here's why!

Skellysolve is unequalled in purity, uniformity, and stability. Because we have long pioneered in the development of extra-quality industrial naphthas, the name Skellysolve assures you of the finest characteristics, closest cuts, constant uniformity, and low evaporation losses.

Here's why!

Source of supply is unequalled for dependability and swiftness. We have the raw materials, the plants and equipment, the experience, and even more important—the *will* to serve you! Further, Skellysolve is shipped in cars used for no other purpose. There's no chance of contamination or mixture with other materials.

Here's why!

A wide variety of special naphthas assures you of the right type of Skellysolve for your particular operation—assures better products, more uniform products, more economy in production.

Here's why!

New technical developments make Skellysolve even finer today than in the past. You'll save time, money, and trouble by checking Skellysolve properties and prices first. Write or wire for information.

SKELLY

SKELLYSOLVE

SOLVENTS DIVISION, SKELLY OIL COMPANY

SKELLY BLDG., KANSAS CITY, MISSOURI

Formula for more sales appeal!

YOUR PRODUCTS + JOHNSON'S RUBBER FINISHES

Here's new beauty and extra protection for your rubber products—beauty and protection that will step up appearance . . . make your merchandise more attractive to buyers!

It's Johnson's Rubber Finishes, the *wax* finishes that add so much to the good looks of rubber products. They give rubber goods a lustrous beauty that increases "eye" and "buy" appeal. They add wax protection, too . . . against "shopwear" . . . scuffs and scratches . . . dirt and finger marks. They help guard against oxidation and sun checking, destroyers of rubber surfaces and sales.

Easily applied by spraying, dipping or wiping, Johnson's Rubber Finishes can be inexpensively worked into your production set-up. They resist cracking and scaling, are non-flammable, and available in clear or black.

SEND FOR FREE SAMPLE! See for yourself how a Johnson's Rubber Finish improves the appearance of your product. Fill out and mail the coupon today!

These and many other rubber products are made more saleable by Johnson's Rubber Finishes

Door mats · Hot water bottles · Rubber gloves · Refrigerator gaskets · Rubber toys · Soles and heels · Tires · Garden hose Stair treads · Rubber boots, overshoes

JOHNSON'S RUBBER FINISHES

Trademark Reg. U. S. Pat. Off.

Made by the makers of Johnson's Wax

(A name everyone knows)

S. C. JOHNSON & SON, INC., Racine, Wisconsin

Hold your War Bonds to hold off inflation!

S. C. JOHNSON & SON, INC.
Dept. RA-26, Product Finishes Dept., Racine, Wis.

Gentlemen: Yes, your Rubber Finishes sound good to me. Send me free sample of
_____ *clear* _____ *black*

Name _____ Title _____

Address _____

Company _____

Product _____

Technical Bulletin No. 18 — on the Compounding of GR-S with Substantial Loadings of Zinc Oxide

100 Parts of Zinc Oxide with GR-S-10 (Rosin Soap Polymer)

ORIGINAL RESULTS

Time of Cure Min. at 45 Lb.	Tensile Strength (psi)	Per Cent Elongation	Modulus Load (psi) for Elongation of: 200%	300%	400%	500%	Permanent Set	Shore Hardness	Tear Resistance Tested at: Room Temp.	100°C.
4	1340	900	150	185	260	335	.25	33	89	56
7.5	1185	710	150	260	405	590	.13	38	75	54
15	1410	660	230	340	495	725	.12	40	67	61
30	1195	555	225	335	525	895	.09	41	67	43
45	1295	560	260	370	590	1000	.08	43	61	38
60	1055	550	225	340	530	830	.05	43	61	39
90	1150	555	220	370	555	890	.05	43	60	37

Time of Cure Min. at 45 Lb.	Shore Hardness	Goodyear-Healey Pendulum: Indentation in mm.	Goodyear-Healey Pendulum: Per Cent Rebound	Compression Fatigue (Goodrich Flexometer)*: Per Cent Initial Comp.	Running Time and Per Cent Permanent Set	Max. Temp. Rise °C.	Dynamic Compression: Initial	Dynamic Compression: Final	Cut-Growth Resistance Inches Failure at: 3,000 Cyc.	4,000 Cyc.
45	41	8.61	58.0	23.6	15'-7.4	33.2	7.4	12.9	.47	.63

* Test Conditions: 93 lb. Load. 0.25" Stroke. 100° C. Oven Temp.

"MBT-DPG" Acceleration

(Refer to Technical Bulletins No. 9, 10, 11, 13, 14, and 16)

CONTINUING the study of Zinc Oxide in the rosin soap polymer, MBT activated with DPG develops satisfactory stress-strain properties, and improved tear resistance both at room temperature and at 100°C., with low permanent set. The room temperature rebound of the GR-S-10 polymer is lower than that of standard GR-S, but at 100°C. the properties are reversed. This accounts for the generally lower heat build-up of GR-S-10 compounds in the Goodrich Flexometer.

COMPOUND NO. 18

GR-S-10	100.0
Sulfur	2.75
MBT	1.5
DPG	0.25
ELC Magnesia	5.0
Coumarone-indene Resin	7.5
Zinc Oxide	100.0

Uniform Quality HORSE HEAD ZINC OXIDES

THE NEW JERSEY ZINC COMPANY

160 FRONT STREET • NEW YORK 7, N.Y.

Products Distributed by THE NEW JERSEY ZINC SALES COMPANY

NEW YORK • CHICAGO • BOSTON • CLEVELAND • SAN FRANCISCO

ANNOUNCING

INDOIL
CHEMICAL PRODUCTS

Polybutenes
High Boiling Aromatics

Rubber Plasticizers
"639½"

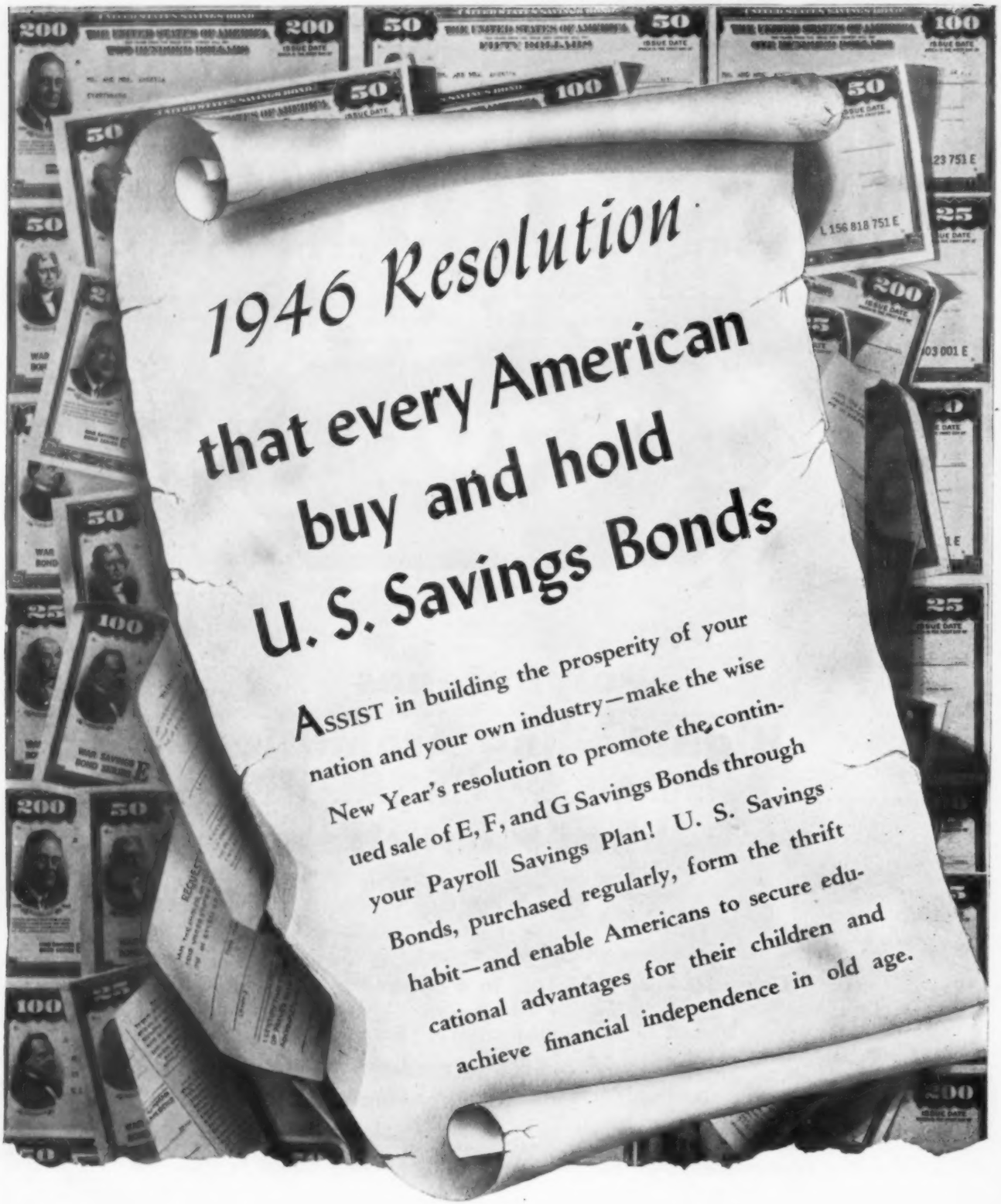
Comparison with Ten Competitive Softeners
Using 10 Parts/100 GRS in a Typical Tread Stock

Shows

- Lowest Mooney Plasticity
- High Original Tensiles and Elongations
- Good Tear
- Satisfactory Aging—Bomb, Oven, and Sunlight
- Reduced Blistering*
- Low Compression Set
- Normal Shrinkage
- Relative Freedom from Staining
- Flexing Equal to Pine Tar

*Volatility of "639½" is low—typical flash point 515°F.

STANDARD OIL COMPANY (INDIANA)
CHEMICAL PRODUCTS DEPARTMENT
910 SO. MICHIGAN AVENUE, CHICAGO 80, ILLINOIS


1946 Resolution
that every American
buy and hold
U. S. Savings Bonds
ASSIST in building the prosperity of your nation and your own industry—make the wise New Year's resolution to promote the continued sale of E, F, and G Savings Bonds through your Payroll Savings Plan! U. S. Savings Bonds, purchased regularly, form the thrift habit—and enable Americans to secure educational advantages for their children and achieve financial independence in old age.

The Treasury Department acknowledges with appreciation the publication of this message by

THE RUBBER AGE

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and War Advertising Council

Use UNITED BLACKS for best results

KOSMOS 20
DIXIE 20 — SRF

KOSMOS 40
DIXIE 40 — HMF

KOSMOBILE 77
DIXIEDENSED 77 — EPC

UNITED CARBON COMPANY, INC.

CHARLESTON, W. VA.

NEW YORK • AKRON • CHICAGO

At Your Service—

RESEARCH

STUDYING THE PROCESSING CHARACTERISTICS OF RUBBER WITH AN EXTRUSION PLASTOMETER

United research facilities and extensive laboratories, fully staffed with trained personnel, have these standing assignments:

1. To control the carbon black production to specifications and uniformity.

2. To help solve problems connected with the use of carbon black.

3. To anticipate the needs and demands of industry for improved types of carbon black.

Let United's research organization work with you on your carbon black problems. Prompt service and the utmost cooperation rendered. Your inquiries will receive immediate attention.

Would you like to have a copy of "Developments and Status of Carbon Black?" It will be sent to you on request.

RESEARCH DIVISION

UNITED CARBON COMPANY, INC.

Charleston, West Virginia

FOR UNIFORMITY AND PURITY

IN CHEMICALS FOR THE NEW RUBBERS

SELECT THESE GENERAL CHEMICAL PRODUCTS FOR YOUR REQUIREMENTS:

BASIC CHEMICALS

GENERAL CHEMICAL COMPANY

FOR AMERICAN INDUSTRY

Sulfuric Acid: All grades and strengths.

Aluminum Sulfate: To precipitate polymerized synthetic rubbers.

Fluosulfonic Acid: For production of Boron Trifluoride.

Potassium Cyanide—Sodium Cyanide: In production of acrylonitrile rubbers.

Sulfur: Commercial Rubbermakers' and other grades.

Copper Fluoborate—Zinc Fluoborate—Copper Cyanide—Sodium Cyanide: Intermediates for "plating" rubber to metals.

Lead Fluoborate: For lead plating in battery manufacture.

Baker & Adamson Reagents and Fine Chemicals

GENERAL CHEMICAL COMPANY

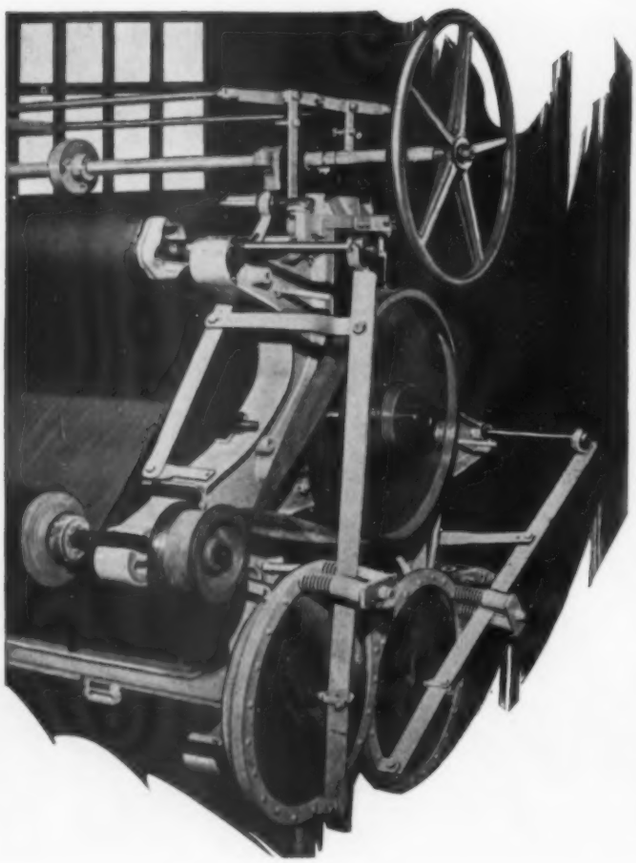
40 RECTOR STREET, NEW YORK 6, N. Y.

Sales and Technical Service Offices: Atlanta • Baltimore • Boston • Bridgeport (Conn.) Buffalo • Charlotte (N. C.) • Chicago • Cleveland • Denver • Detroit • Houston • Kansas City • Los Angeles • Minneapolis • New York • Philadelphia • Pittsburgh • Providence (R. I.) San Francisco • Seattle • St. Louis • Utica (N. Y.) • Wenatchee • Yakima (Wash.)

In Wisconsin: General Chemical Wisconsin Corporation, Milwaukee, Wis.

In Canada: The Nichols Chemical Company, Limited • Montreal • Toronto • Vancouver

Here's PROOF *That*



"It Does the Job Everyone Said Couldn't Be Done!"

This is a picture of a Stanford Automatic Web Guide on the job. In scores of great plants throughout the country, it's doing a job that everyone said confidently couldn't be done.

Consider just one example. We guarantee that our web guide will hold your trim or weave to within 1/16 inch, plus or minus. On certain types of materials, we'll produce a roll with ends as true as though cut with a knife. It couldn't be done —but we did it!

It's always hard to believe that anyone has done what everyone says can't be done, so we don't ask you to believe what we're putting down here in black and white. What we *do* ask is that you give us a chance to prove to you, in your own plant, on your own equipment, that every word of our claims is true.

Without cost or obligation of any kind, we'll install a Stanford Automatic Web Guide in your plant. If you don't want it, we'll take it out, also without charge or obligation. Nothing could be simpler, nor fairer, than that!

Phone, wire, or write *today*—before you turn this page!

Important Firms Using the STANFORD WEB GUIDE

Bauer & Black, B. F. Goodrich Co., Johnson & Johnson, Hood Rubber Company, Plymouth Rubber Company, Middletown Rubber Company, Cambridge Rubber Company, Seamless Rubber Company, Landers Corporation, General Felt Products, Acme Backing Corp., Acme Wire Company, Dobeckmun Company, Irvington Varnish Company, Garco Products, Inc., Haartz-Mason-Grower Co., National Automotive Fibres, Columbia Combining Company, Vulcan Proofing Company, National Backing Corp., Respro, Inc., and Bemis Associates, Inc.

Stanford
AUTOMATIC
WEB GUIDE

STANFORD ENGINEERING COMPANY
SALEM, ILLINOIS TORONTO, CANADA

A Para-Coumarone Indene Resin
. . . with Special features for makers of
Rubber
NATURAL
RECLAIMED
SYNTHETIC

PICCOUMARON

The uses for which Piccoumaron Resins are applicable include tackifying, softening, plasticizing, hardening, strengthening. They are made in various grades ranging from a liquid, to brittle solids having a melting point of over 120°C. Colors range from 1½ to 16 on the coal tar resin scale. Piccoumaron resins are thermoplastic; have good alkali and acid resistance; are soluble in most solvents, including low-cost naphthas; are compatible with other resins, petroleum and coal tar residues, pitches, certain waxes.

Due to heavy demands for Picco Products, we are sometimes unable to guarantee prompt deliveries of certain types. However, we will be glad to help you select the proper types and grades for your particular use, and schedule the earliest possible delivery for your orders.

Write for Specifications and Application Data

Makers of: Coumarone Resins
Coal Tar Naphthas · Rubber
Plasticizers · Reclaiming Oils
Terpene Resins · Styrene Resins

Pennsylvania
INDUSTRIAL CHEMICAL CORPORATION
CLAIRTON, PENNA.

PICCO

Distributors to the Rubber Industry — Standard Chemical Company, Akron, Ohio

"IDEAL DUSTING AGENTS FOR RUBBER PRODUCTS AND MOLDS"

MEMORANDUM
TO Purchasing Agent
WITCO BARIUM AND ZINC STEARATES
are ideal dusting agents for rubber products and molds. Unfinished rubber articles knit together satisfactorily during subsequent curing operations because the Barium and Zinc Stearate particles dissolve in the rubber matrix during vulcanization, leaving a clean surface. Witco Barium Stearate possesses the additional advantage of an extremely high melting point (257°C), permitting its use in high temperature operations in which other agents liquefy and run off. Witco Zinc Stearate is also efficient as an accelerator activator—particularly in GR-S—as it lessens variation in rate of cure.
O.K.
Send for samples today

New! **"WITCO PRODUCTS" BOOKLET—**

gives complete and up-to-date information on Witco Barium and Zinc Stearates and all other Witco products... conveniently arranged for ready reference. Write for your copy today.

WITCO CHEMICAL COMPANY

Manufacturers and Exporters

295 MADISON AVENUE, NEW YORK 17, N. Y.

Boston • Chicago • Detroit • Cleveland • Akron • London

projecting the reasons why rayon cord tires are superior...

RAYON CORD TIRES ARE *SAFER, WEAR LONGER*

BECAUSE THEY *RUN COOLER!*

The *lighter* the tire, the cooler the running. Tire men will tell you that. Rayon cord, because it's stronger, requires less cord and less rubber; therefore makes a lighter tire.

What's more, as a tire heats up, rayon's strength goes up. And there you have it—rayon defies heat, gives a cooler running tire whether made with natural rubber, synthetic rubber or combinations of the two.

These two heat-resisting factors are responsible for the reports of bus and truck fleet operators who have used rayon cord tires and found them longer on mileage, shorter on blow-outs and road failure.

Perhaps it's hard to believe that rayon, dainty filament of fashion, should prove the ideal fiber of cord-based tires. But the war proved it, and our mobile armies kept rolling on rayon. Now you, the motorists of America, will profit by the lessons learned on the treacherous highways of war.

You'll soon be riding on rayon yourself. You'll be experiencing a new concept of tire performance—tires that will wear as long as you will want to drive your car—tires that will carry you more comfortably because they flex easier and offer less rolling resistance—tires that run cooler, reducing the menace of blow-outs and road failure. It will be a new day in motoring—the day you drive off on your first rayon cord tires.

Industrial Rayon has been manufacturing rayon tire yarn, cord and fabric right through the war. And now our rayon, known as Tyron, is rolling out in a steady stream for the tires of peace. Made by our exclusive Continuous Process, Tyron is given the utmost uniformity—and it's the uniformity of the cord and fabric that makes for uniformity in the tire, so essential in tire manufacturing and tire performance.

Industrial
RAYON CORPORATION
Cleveland, Ohio
makers of TYRON and rayon

...to 14,463,906 more American motorists

This ad, appearing in THE SATURDAY EVENING POST, COLLIER'S and THE AMERICAN WEEKLY, is another in Industrial's series, acquainting the American public with the enormous advances in tire-making made possible by the use of the miracle fibre, Rayon. An ad can only tell so much. For you, in the trade, we have a much more complete story in booklet form. Send for "Rolling on Rayon." It's FREE and "must" reading for every one connected with the tire industry.

*TYRON

*Reg. U. S. Pat. Off.

rayon for tires

Made by INDUSTRIAL RAYON CORPORATION
Cleveland, Ohio

HARCHEM offers you a *complete* line of Plasticizers for Vinyl Resins, Synthetic Rubbers and other Plastics and Elastomers.

HARCHEM has developed a variety of Plasticizers, each with its own special combination of properties. This enables the user to select that particular product most suited to his own needs.

Consult us if you have a Plasticizer problem. Our technical staff will be glad to assist you.

BINNEY AND SMITH CO.

DISTRIBUTOR TO THE RUBBER INDUSTRY

HARDESTY CHEMICAL CO., INC.

41 EAST FORTY-SECOND STREET, NEW YORK 17, N. Y.

Serving the

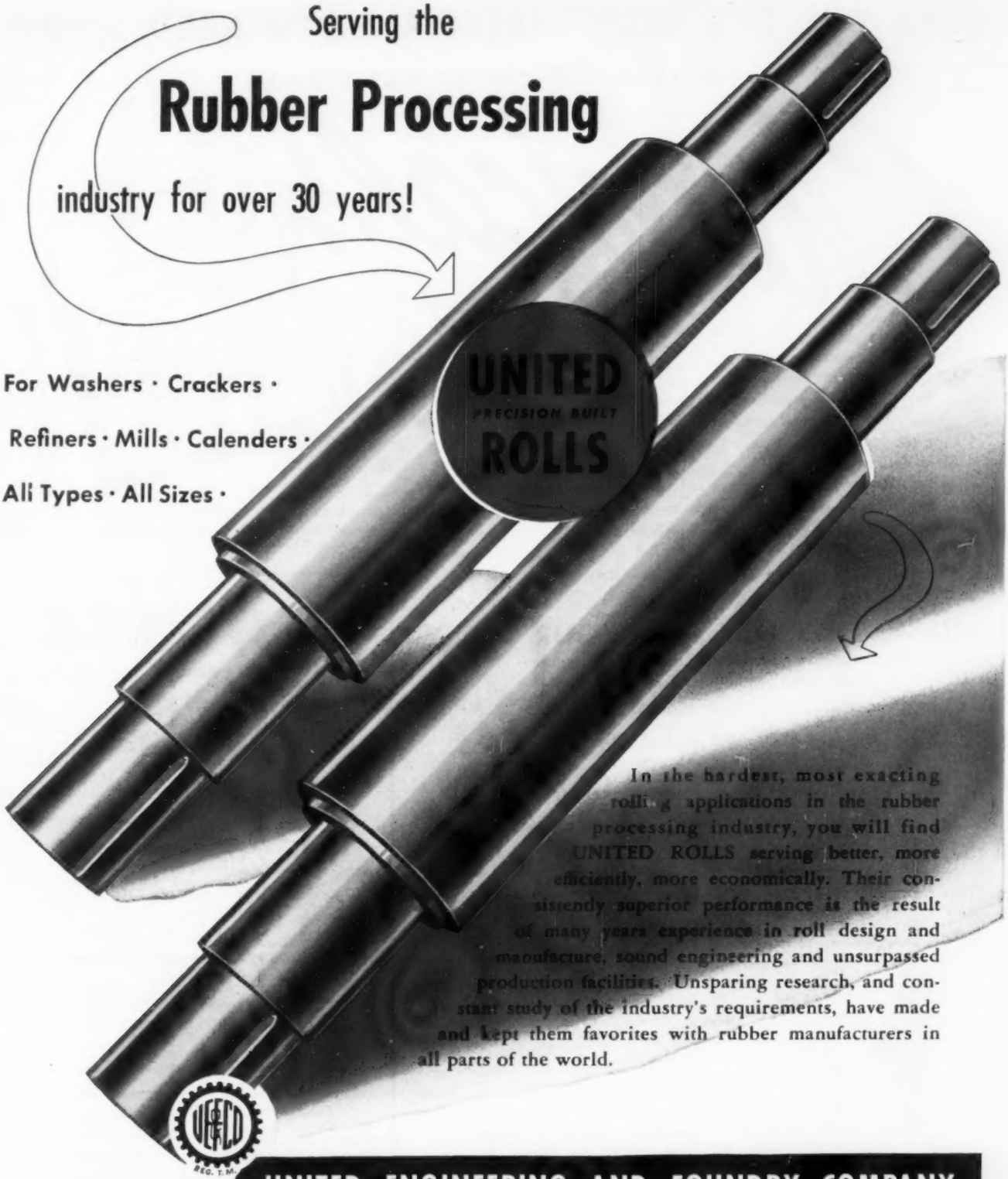
Rubber Processing

industry for over 30 years!

For Washers · Crackers ·

Refiners · Mills · Calenders ·

All Types · All Sizes ·



In the hardest, most exacting rolling applications in the rubber processing industry, you will find UNITED ROLLS serving better, more efficiently, more economically. Their consistently superior performance is the result of many years experience in roll design and manufacture, sound engineering and unsurpassed production facilities. Unsparing research, and constant study of the industry's requirements, have made and kept them favorites with rubber manufacturers in all parts of the world.

UNITED ENGINEERING AND FOUNDRY COMPANY
Pittsburgh, Pennsylvania

Plants at Pittsburgh · Vandergrift · New Castle · Youngstown · Canton

Subsidiary: Adamson United Company, Akron, Ohio

Affiliates: Davy and United Engineering Company, Ltd., Sheffield, England
Dominion Engineering Works, Ltd., Montreal, P. Q., Canada

★ *The World's Largest Designers and Makers of Rolls and Rolling Mill Equipment*

HERE ARE THE BASIC MATERIALS YOU NEED...NOW!

GOVERNMENT-OWNED WAR SURPLUS

Chemicals

SPECIAL NAPALM THICKENER

Mixture of Oleic, Napthenic, and Cocoanut Fatty Acids, representing a metallic soap compound. 971,850 lbs., Denver, Colorado. 216,200 lbs., Birmingham, Alabama. Packed in drums, price $.10 per lb. in carload lots and $.12 per lb. l.c.l.

One of the most important of the Surplus Disposal jobs assigned to the War Assets Corporation, a subsidiary of RFC, is the selling . . . *now* . . . of a large and varied stock of Surplus Chemicals. These chemicals represent a tremendous Government investment, but *they are priced for quick sale and represent real values to industrial users!*

Because of space limitations, only a few of the major items are offered in this advertisement. If you are interested in any of the items offered here, write, wire or telephone the RFC Agency Office listed below, where the stock is located. Act quickly! All items offered are F. O. B. Location. Credit terms may be arranged.

VETERANS: To help you exercise your priority, special veteran service facilities are now available at our offices.

CHECK THIS LIST FOR YOUR NEEDS

and have your name placed on our regular mailing list by mailing the attached coupon.

CHECK AND MAIL TODAY!

To War Assets Corporation:

Please send me further information on the following products:

- ☐ Glacial Acetic Acid, CP, 10,067 gallons in one-gallon bottles, San Francisco, Calif., price $1.00 per gal.
- ☐ Glacial Acetic Acid, CP, 1,416 gallons in one-gallon bottles, Portland, Oregon, price $1.00 per gal.
- ☐ Bakelite Rods & Sheets, Large Quantities, various sizes and dimensions, Phila., Pa.
- ☐ Copper Napthenate, 28,212 lbs., 8% solution, in drums, Cleveland, Ohio, price $.12 per lb.
- ☐ Copper Napthenate, 22,220 lbs., 8% solution, in drums, Nashville, Tennessee, price $.12 per lb.
- ☐ Copper Napthenate, 10,037 lbs., 8% solution, metal drums, Charlotte, N. Carolina, price $.12 per lb.
- ☐ Copper Napthenate, 6,613 lbs., 8% solution, in drums, Birmingham, Ala., price $.12 per lb.
- ☐ Sodium Sulphite, 492,000 lbs., 100-lb. bags, Nashville, Tenn., price $30.00 per ton.
- ☐ Manganous Chloride, 100 short tons, in bulk, Salt Lake City, Utah, price $50.00 per ton.

Firm .....

Street .....

City ..... State .....

(155-1)

Contact your nearest RFC Agency Office listed below for information, regarding *all* surplus materials. If your local RFC office does not have all the materials you need, it will endeavor to locate them from other offices throughout the country.

PAINTS

PROTEIN BINDER COLD WATER CAMOUFLAGE PAINT, TYPE I
Specification: ES-T-1093
Colors: Burnt Sienna, Burnt Umber, Deep Green, Blue, Chrome Oxide Green, Iron Oxide Red, Earth Red
Packed in 5 pound cartons
Richmond, Virginia
Price: 2¢ per pound

OLEORESINOUS (EMULSIFIABLE) CAMOUFLAGE PAINT
Specification: T-1279
Color: Olive Drab
Packed in 5 gallon containers
San Francisco, California
Price: 65¢ per gallon
Minimum sale: 200 gallons

OIL TYPE READY MIXED CAMOUFLAGE PAINT
Specification: T-1215
Colors: Olive Drab, Loam, Earth Brown, Field Drab, Earth Red, Dark Green
Packed mostly in 5 gallon containers
San Francisco, California
Price: 65¢ per gallon
Minimum sale: 200 gallons of any one color

CAMOUFLAGE LACQUER
Specification: M-485 & M-485 C. Colors: Light Gray & Blue Gray
Packed in 5 gallon containers
Philadelphia, Penna.
Price: 50¢ per gallon

LACQUER DOPE
Specification: 3-109-E
Color: Olive Drab
Packed in 30 gallon drums
Chicago, Illinois
Price: 50¢ per gallon

A DISPOSAL AGENCY DESIGNATED BY THE SURPLUS PROPERTY ADMINISTRATION for Surplus Producers' and Capital Goods, Aircraft and Plants formerly handled by Reconstruction Finance Corporation . . . and for Surplus Consumer Goods formerly handled by United States Department of Commerce.

WAR ASSETS CORPORATION

(A SUBSIDIARY OF RECONSTRUCTION FINANCE CORPORATION)

RFC OFFICES (INCLUDING FORMER DEPARTMENT OF COMMERCE REGIONAL SURPLUS PROPERTY OFFICES) LOCATED AT: Atlanta • Boston • Chicago • Denver • Kansas City, Mo. • New York • Philadelphia • San Francisco • Seattle • OTHER RFC SURPLUS PROPERTY OFFICES LOCATED AT: Birmingham • Charlotte • Cleveland • Dallas • Detroit • Helena • Houston • Jacksonville • Little Rock • Los Angeles • Louisville • Minneapolis • Nashville • New Orleans • Oklahoma City • Omaha • Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • Spokane • OTHER FORMER DEPARTMENT OF COMMERCE REGIONAL SURPLUS PROPERTY OFFICES LOCATED AT: Cincinnati and Fort Worth

CALL ON WHITTAKER

for minerals, colors and pigments from A to Z

Perhaps you know Whittaker as a quality source of one or two materials. Good! Many do. But many more are learning that the same high Whittaker quality is available in a wide range of other minerals, colors and pigments, too.

You can place your order for commercial quantities of *any* Whittaker product with the same confidence. Every one of them is "engineered" to laboratory standards. Uniformity and quality of product are strictly controlled by thorough tests for particle size, purity, weight and color – your assurance that Whittaker minerals, colors and pigments will perform properly in your product or process.

Write for detailed product data laboratory samples, or help and information from the Whittaker technical staff.

203

ALBATEX
ALUMINUM SILICATE
ALUMINUM STEARATE
ANTIMONY SULPHIDE
ASBESTOS
ATOMITE
BARIUM SULFATE
BARYTES
BENTONITE
BLACKS
BLANC FIXE
BLUE
BORAX
BORIC ACID
CALCITE
CALCIUM CARBONATE
CALCIUM HYDROXIDE
CALCIUM OXIDE
CALCIUM STEARATE
CALCIUM SULFATE
CASEIN
CHALK
CLAYS
CLIFFSTONE WHITING
COLORS
CORN DEXTRINE
CORN STARCH
COSMETIC COLORS
CROCUS MARTIS
CHROMIUM OXIDE GREEN
DENTAL PLASTER
DIATOMACEOUS EARTH
EARTH COLORS
EARTHS
FELDSPAR
FIBROUS TALC
FILTER AIDS
FILTERING EARTHS
FLINT
FLUORSPAR
FORMALDEHYDE DUST
FOSSIL FLOUR
FULLERS EARTH
GRAPHITE
GREEN HOUSE SHADING
GROUND GLASS
GYPSUM
HYDRATED LIME
HYDRO MAGMA
INFUSORIAL EARTH
IRON OXIDE
KAOLIN
KIESELGUHR
LIME
LIMESTONE
LITHARGE
LITHOPONE
MAGLITE
MAGNESITE
MAGNESIUM CARBONATE
MAGNESIUM HYDROXIDE
MAGNESIUM OXIDE
MAGNESIUM SILICATE
MAGNESIUM STEARATE
MAGNESIUM TRISILICATE
MARBLE
MARBLE CHIPS
MICA GROUND
NON-SLIP CHIPS
OCHRE
OPTICAL ROUGE
ORTHOPEDIC PLASTER
PARIS WHITE
PLASTER PARIS
PLUMBAGO
PUMICE STONE
PUTTY POWDER
PYRPHYLLITE
QUARTZ
RED OXIDE
RICH STARCH
ROTTENSTONE
ROUGE
SERICITE
SIENNAS
SILEX
SILICA
SLATE
SOAPSTONE
SOAPSTONE CRAYONS
SOLAR SHADE
STEARATES
STEATITE
STEARIC ACID
TALC
TALC CRAYONS
TERRA ALBA
TERRAZZO STRIPS
TIN OXIDE
TITANIUM DIOXIDE
TRIPOLI
UMBERS
VENETIAN RED
VIENNA LIME
VOLCANIC ASH
VOLCLAY
WHITING
YELLOW OXIDE
ZINC OXIDE
ZINC STEARATE

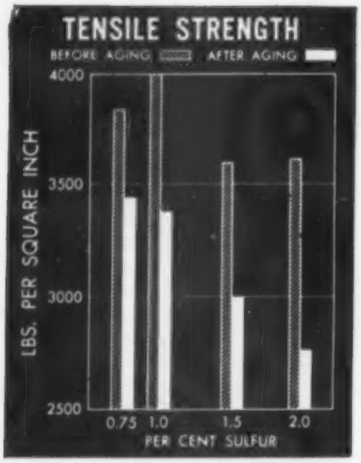
Whittaker, Clark & Daniels, INC.

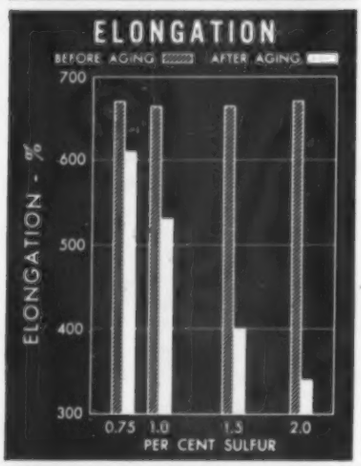
260 West Broadway, New York 13, N. Y. • Plant: South Kearny, New Jersey

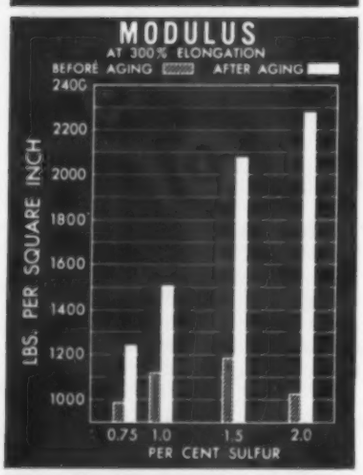
EST. WHITTAKER 1910

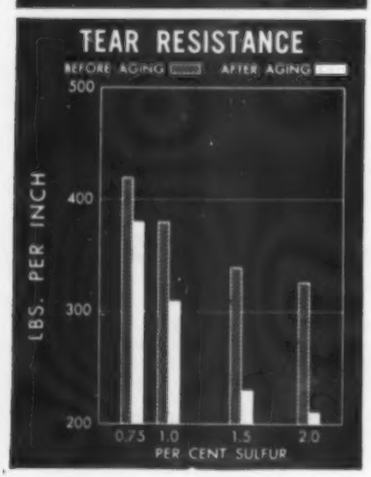
SALES REPRESENTATIVES

CHICAGO Harry Holland & Son, Inc.	MEMPHIS, TENN. L. E. Offutt Co.
PHILADELPHIA R. Peltz Company	CLEVELAND Palmer Supplies Co.
NEW ORLEANS E. W. Ortenbach	TORONTO & MONTREAL Richardson Agencies, Ltd.









Give your GR-S Compounds heat stability provided by low sulfur content

Safe, fast curing now made possible by FBS LITHARGE

As you know, reduction in sulfur content means increase in heat stability.

It has now been demonstrated that FBS litharge (plus benzothiazyl disulfide) makes low sulfur formulas practicable.

Why?

Because it speeds up greatly the rate of cure without increasing the risk of scorching.

Thus, even though the normal quantity of accelerator is used, *the sulfur content can be reduced.*

Note, in the series of tests charted and tabulated, the superior behavior of the 0.75 and 1.0 sulfur formulas.

FORMULA

GR-S (Institute)	100
E.P.C. Carbon Black	50
Zinc Oxide	3
Coal tar softener	5
Benzothiazyl Disulfide	1.0
FBS Litharge	1.5
Sulfur	variable

Effect of Varying Amounts of Sulfur on Physical Properties

(Curing period: 20 min. Temp: 287° F.)

% Sulfur	*Tensile Strength*	*% Elongation*	*Modulus at 300% Elong.*	*Tear Resistance*
0.75	3840	670	980	420
1.0	4000	665	1120	380
1.5	3600	665	1190	340
2.0	3620	670	1025	325
After Aging 24 Hours at 100° C.				
0.75	3460	610	1240	380
1.0	3380	530	1510	310
1.5	3000	400	2080	230
2.0	2770	340	2280	210

CONCLUSIONS:

1. FBS Litharge-thiazole with low sulfur imparts heat stability.
2. Modulus is high and steady.
3. Elongation is retained despite exposure to heat.
4. Heat stability prevents brittleness and improves tear resistance.
5. Rate of cure is relatively fast, without tendency to scorch.
6. The combination is inexpensive and efficient.

Ask us to send you a printed report, "Compounding of GR-S for Heat Resistance," issued by the Rubber Division of our Research Laboratories, which covers the subject of FBS Litharge for low sulfur formulae in greater detail and from a number of additional angles.

NATIONAL LEAD COMPANY New York, Buffalo, Chicago, Cincinnati, Cleveland, St. Louis, San Francisco; Boston (National-Boston Lead Co.); Pittsburgh (National Lead & Oil Co. of Penna.); Philadelphia (John T. Lewis & Bros. Co.).

Four Divisions One Purpose

WHEN you see the N-S trade-mark on a product, it is your assurance of unvarying quality. For this trade-mark, regardless of which division of National-Standard it identifies, stands for one overall policy.

This policy stresses—first, the importance of completely understanding the customer's problems. Second, that the engineering experience and research facilities of each division be made fully available to solve specific problems. Third, to always continue development work that will result in still further improvements in customers' products and methods of manufacture.

The products listed at the right indicate the wide scope of services offered by the four divisions of National-Standard Company. Your letter to any one of these will bring quick, personalized service.

NATIONAL-STANDARD COMPANY
NILES, MICHIGAN

Wire Braids flat and tubular in Steel or other metal. Tapes and Specialized Wire Products for Tire Beads, Steam Hose Armor, Reinforcement for Oil Well Drilling Hose. Braided Covering for Flexible Tubing, Aircraft and Tank Radio Shielding. Stranded Wire for reinforcing Flat and V Belts. Braided Covering for Electrical Cables. Drawn wire in small sizes down to .002, of Steel, Aluminum, Brass, Monel, Nickel Silver, Stainless Steel, Phosphor Bronze and other Alloys.

THE ATHENIA STEEL COMPANY, DIVISION
CLIFTON, NEW JERSEY

Cold Rolled, High Carbon Flat Steels in widths of 1/16" to 6½", Thickness .0015 to .062 Custom-made Steels—.60 Carbon and higher. Entire range of Annealed, Hard Rolled, Black Tempered, Tempered and Polished or Tempered and Polished with Blue or Straw Colored finish, Best quality Small Flat Springs.

WORCESTER WIRE WORKS, DIVISION
WORCESTER, MASS.

High quality Wire in small diameter sizes, down to .006. Round, Low and High Carbon Steel. Annealed, Hard Drawn, Tempered, Bright, Liquor Finish, Tinned, Copper Coated, Cadmium Coated, Galvanized.

WAGNER LITHO MACHINERY CO., DIVISION
HOBOKEN, NEW JERSEY

Complete lines of automatic equipment—designed, manufactured and installed for can companies and others using sheets in the metal decorating trade. Individual units consist of Roller Coating Machines, Conveyor Type Ovens and Auxiliary Equipment for tandem operation with lithographing presses, etc.

TELLING THE PUBLIC

TIRES made with RAYON CORD keep them Safer!

LIKE SHATTER-PROOF GLASS

LIKE ALL-STEEL TOPS

tires made with rayon cord stand out today as a great milestone in motoring safety. They'll soon be rolling beneath America's cars in greater and greater numbers.

Proved safer by Army tests, rayon cord tires were demanded by the Army early in the war . . . demanded for bombers, trucks, jeeps, mobile guns, fighter planes.

Many million rayon cord military tires have since proved the Army right. So have countless million miles of war-necessary service of bus and truck companies.

Now, tire makers are preparing to put *all* America on rayon cord tires because they're *safer, more economical on gasoline, longer lasting* and *smoother riding.*

Research engineers at American Viscose Corporation, working with the Government and tire manufacturers, helped develop these special rayon tire cords.

We are proud of our part in raising another great milestone on the road to greater motoring safety.

Why the Army Used Rayon Cord Tires

Rayon cord makes tires stronger, safer, lighter. Rayon is made in continuous filaments, of uniform diameter and strength. Higher tensile strength permits thinner sidewalls, reducing rubber-harming friction heat. Rayon retains more tensile strength at high running temperatures and withstands almost infinite flexing. (Source: Hearings before a Special Committee Investigating the National Defense Program, United States Senate—Seventy-Eighth Congress, First and Second Sessions.)

More Safety—Less Operating Cost

Bus and truck companies report that less friction heat, higher tensile strength, and greater uniformity of rayon tire cords mean more safety at high running speeds. Rayon cord tires give longer life, greater mileage . . . reduce impact failures, blowouts, road delays, tire renewals.

AMERICAN VISCOSE CORPORATION

America's largest producer of rayon tire cord, yarn and staple fiber

Offices: 350 Fifth Avenue, New York 1, N. Y.; Charlotte, N. C.; Philadelphia, Pa.; Providence, R. I.; Washington, D. C.; Wilmington, Del.

THIS ADVERTISEMENT appears in THE SATURDAY EVENING POST and a representative list of other important national magazines.

about Rayon Cord Tires

To help acquaint the public with the advantages of rayon cord in tires, American Viscose Corporation has embarked on a campaign to point out that the same qualities which made rayon cord military tires tougher and commercial tires more serviceable . . . will now make civilian tires *safer* and *more economical*.

Our research engineers took active part in the development work that led to the Army's choice of rayon for military tires. Our current goal is to continue cooperative development in every possible way so that stronger, safer, more economical rayon cord tires will be available to motorists everywhere at the earliest possible moment.

AMERICAN VISCOSE CORPORATION

America's largest producer of rayon

Offices: 350 Fifth Avenue, New York 1, N. Y.; Charlotte, N. C.; Philadelphia, Pa.; Providence, R. I.; Washington, D. C.; Wilmington, Del.

Here's a handy coupon to make it easier for you to get the free booklet . . . to be offered through our national advertising . . . that your customers are sending for. It tells the impressive story of "The Record of Rayon Cord in Tires." Just fill in and mail . . .

AMERICAN VISCOSE CORPORATION
350 Fifth Avenue, New York 1, N. Y.

Dept. RA-2

Gentlemen:
Please forward without obligation or cost to me a copy of "The Record of Rayon Cord in Tires."

Name_____

Firm_____

Street_____

City_____ State_____

CHECK THESE 2 PERFORMANCE PROVED CEMENTS AGAINST YOUR NEEDS! *

N-100 SELF-CURING ADHESIVE *

for cementing together or one to another raw fabrics, coated fabrics, molded parts, leather, wood, paper, tubing, sponge, channel-stock, stripping and sheet material . . . *as a Sealant* for rubber and synthetic valve seats, gaskets, etc.

A Two-Part Neoprene Base Formula of Brush Viscosity and Neutral in Color

. . . Extremely high green strength . . . Good strength after standing 3 to 4 hours . . . Optimum cure reached in 10 days at 68-70° F (in 16 hours at 100-125° F; in 1 hour at 255-260° F) . . . Excellent water, oil, flame and delamination resistance . . . Chemical resistance to acetic acid, alcohols, aliphatic hydrocarbons, ammonia, calcium chloride, copper sulphate, fatty acids, hydrochloric acid, oxalic acid, phenol, sodium hydroxide, sulfuric acid . . . Extremely high shear strength . . . Contains no Benzol.

N-800 NEOPRENE PUTTY *

for Filling rubber, neoprene and other synthetic rubber parts . . . *for Repairing* wire cable . . . *as a Binder . . . and for Caulking.*

A Two-Part Neoprene Base Formula of Putty Consistency and Black in Color

. . . Bonds without Primers . . . Optimum cure reached in 10 days at 68-70° F (in 16 hours at 100-125° F; in 1 hour at 255-260° F) . . . High dielectric strength . . . Excellent water, oil and flame resistance . . . Chemical resistance to acetic acid, alcohols, aliphatic hydrocarbons, ammonia, calcium chloride, copper sulphate, fatty acids, hydrochloric acid, oxalic acid, phenol, sodium hydroxide, sulfuric acid.

* Both of these formulas have been *performance-proved* in important war production work over a period of several years.

Address all inquires to the Union Bay State Chemical Company, Rubber Chemicals Division, 50 Harvard St., Cambridge 42, Massachusetts.

UBS

UNION BAY STATE
Chemical Company

Serving Industry with Creative Chemistry

ORGANIC CHEMICALS · SYNTHETIC LATEX · SYNTHETIC RUBBER
PLASTICS · INDUSTRIAL ADHESIVES · DISPERSIONS
COATING COMPOUNDS · IMPREGNATING MATERIALS · COMBINING CEMENTS

The C. P. Hall Co.
CHEMICAL MANUFACTURERS

ACCELERATORS

PLASTICIZERS

ANTIOXIDANTS

A Complete Line of Approved Compounding Materials

AKRON, OHIO • LOS ANGELES, CALIF. • CHICAGO, ILL.

TITANOX ... *the brightest name in titanium pigments*

A NEW INDUSTRY WAS BORN

In 1914, back in the days when the guns of World War I started to boom, the first batch of Titanox-B (Titanium Barium Pigment) was turned out in a small pilot plant at Niagara Falls, New York. At that time, titanium was considered "a chemical curiosity" and a rare element.

In 1916, a factory was built in Niagara Falls for the commercial production of titanium pigments which started operation in 1918. Thus, Titanox became the original commercial titanium pigment in the United States.

The outstanding qualities of opacity, whiteness and brightness which characterized this original "curiosity" proved themselves, and the demand for Titanox pigments became so great that a second and larger factory was erected in St. Louis, Missouri, in 1923.

Later, another factory was built in Sayreville, New Jersey, where production has been going on uninterruptedly since 1935. At both the latter locations, the factories have expanded considerably to meet increasing demands for Titanox.

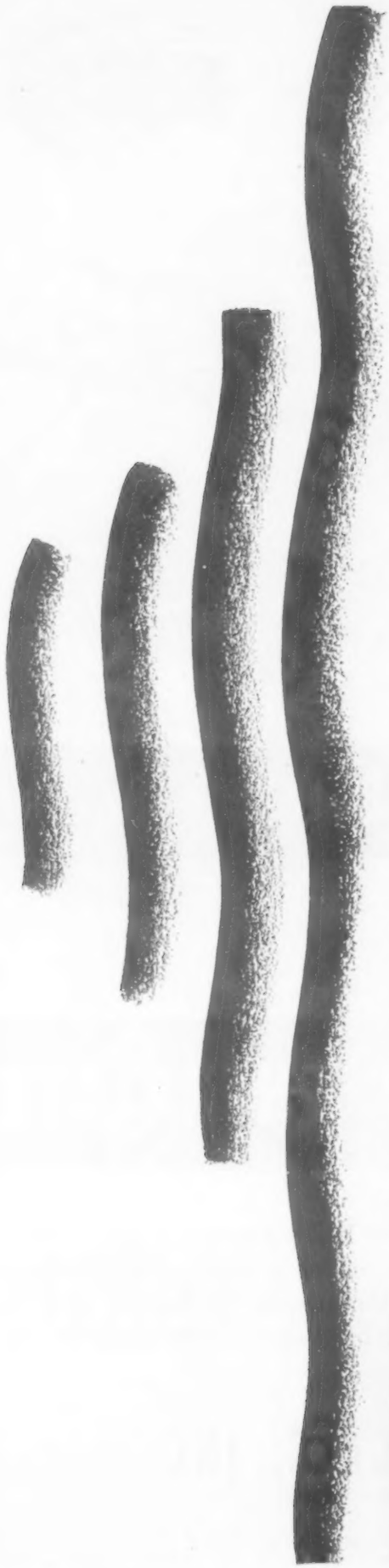
Today, the producers of Titanox are proud of their past untiring efforts toward supplying greater quality products and will constantly continue their efforts in this direction.

TITANOX

TITANIUM PIGMENT CORPORATION

Sole Sales Agent

111 Broadway, New York 6, N. Y.
104 South Michigan Ave., Chicago 3, Ill.
350 Townsend St., San Francisco 7, Cal.
2472 Enterprise St., Los Angeles 21, Cal.



lower heat build-up

:..WITH MONSANTO'S IMPROVED-PROCESS LAMPBLACK No. 10

During the war, many rubber manufacturers discovered the superiority of Monsanto's Lampblack No. 10 . . . and through its use obtained *reduction in friction and heat build-up.*

They learned, too, about the maximum degree of purity and carbon content, the good blue-gray undertone, the freedom from empyreumatic material . . . plus, more recently, a *welcome economy advantage* . . . of this precision-made black by Monsanto.

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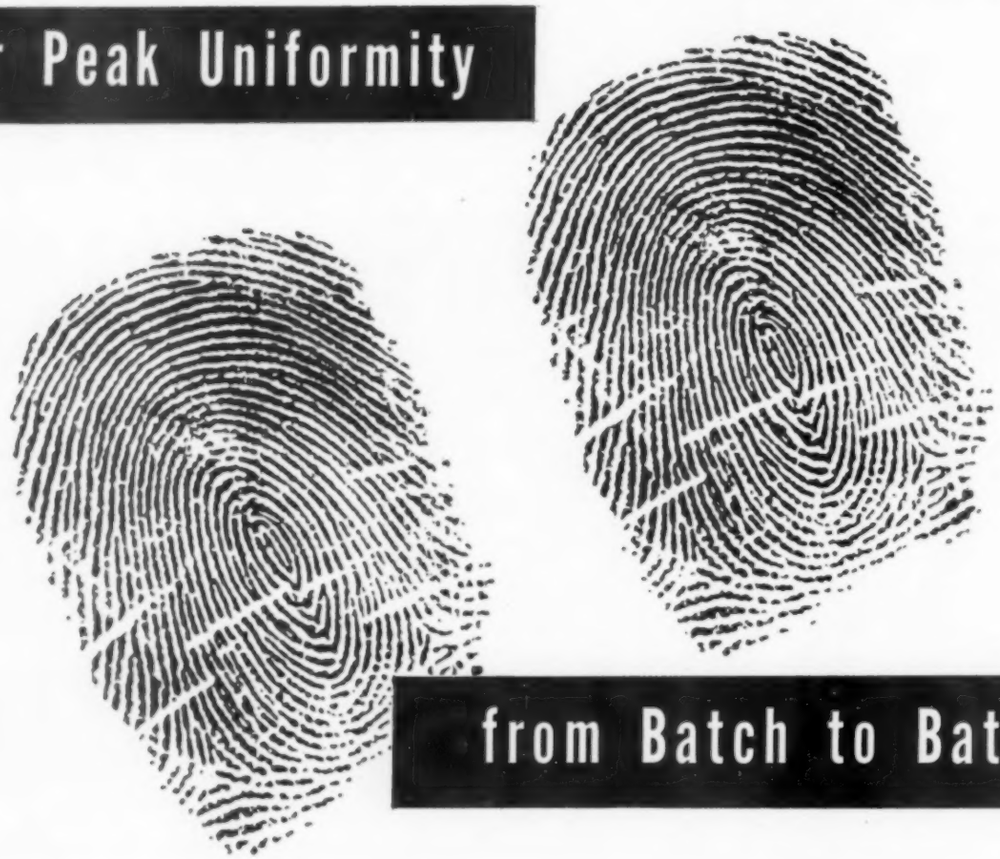

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A-20

HEADLINES and HEADLINERS

No. 16 in a series

*Our Rubber Policy
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Considers Plan, Studies Disposal of Government Plants

World Pact Awaits Decision

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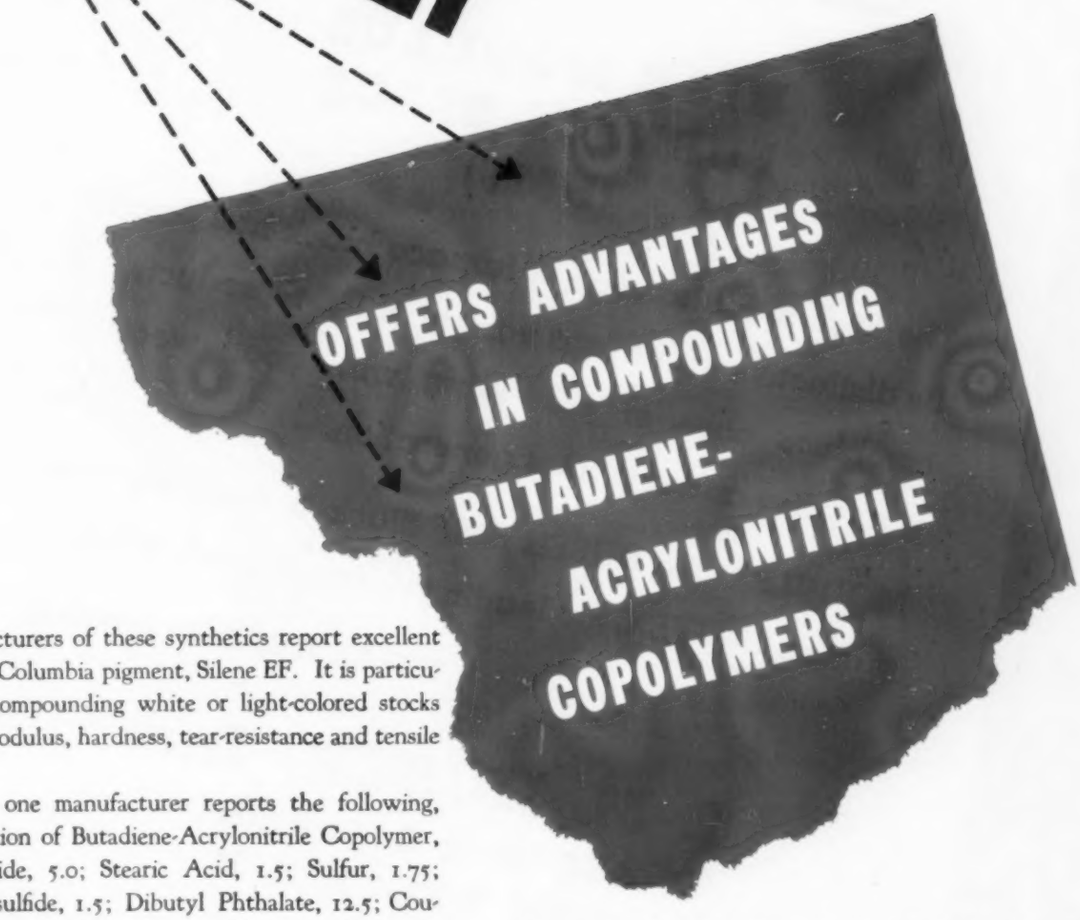
Silene EF



Various manufacturers of these synthetics report excellent results with the Columbia pigment, Silene EF. It is particularly useful in compounding white or light-colored stocks requiring high modulus, hardness, tear-resistance and tensile strength.

For example, one manufacturer reports the following, using a formulation of Butadiene-Acrylonitrile Copolymer, 100.0; Zinc Oxide, 5.0; Stearic Acid, 1.5; Sulfur, 1.75; Benzothiazyl Disulfide, 1.5; Dibutyl Phthalate, 12.5; Coumarone-indene-resin (MP = 20° to 30°C.), 12.5; Silene EF, 150.0; and a cure of 45 minutes:

Modulus at 300%	2050 psi.
Ultimate Tensile	2125 psi.
Ultimate Elongation	330%
Shore Hardness	95
Crescent Tear	348

Properties of stocks of lesser loadings and of aged samples were correspondingly satisfactory. The closest approach to a "white carbon black," Silene EF is a white, extremely finely divided, precipitated, hydrated calcium silicate. Its use is constantly expanding for many diversified natural and synthetic rubber products. You are invited to write for information concerning specific compounding problems.

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VOLUME 58

NUMBER 5

One of the World's Outstanding Rubber Journals

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RUBBER AGE

VOL. 58, No. 5 FEBRUARY, 1946

SILASTIC— The Heat Stable Silicone Rubber

By P. C. SERVAIS

Dow Corning Corporation, Midland, Mich.

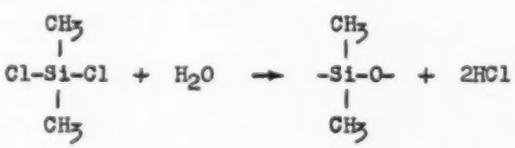
SILICONE products have attracted the interest of engineers and scientists associated with almost all branches of industry because the silicones are new and basically different materials. Included among them are fluids which change very little in viscosity over a wide temperature range, greases for high and low temperature lubrication, electrical insulating varnishes which exclude moisture after long exposure to elevated temperatures, resins for bonding heat resistant panel board and for formulating heat resistant paints, and silicone rubber.

These various silicone products resemble conventional materials and can be handled in similar ways, but being semi-inorganic in chemical structure, they behave quite differently. Probably the most notable difference in behavior is their resistance to change on exposure to extremely high or low temperatures.

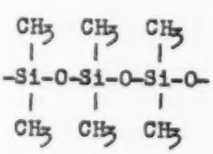
How Silicones Are Formed

The molecular skeleton of all silicone polymers is a stable chain structure based on —Si-O-Si-O—or siloxane linkage. There is no stable counterpart to this structure in carbon chemistry.

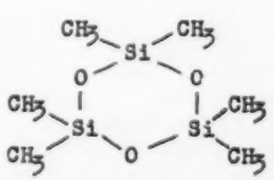
The simplest type of a silicone structure is made from a chlorosilane in which two of the chlorine atoms have been displaced by methyl groups. This substitution may be done by use of the Grignard reaction and by other means. When $(CH_3)_2 SiCl_2$ is hydrolyzed with water the following reaction occurs to form straight chain or cyclic polymers:



The polymers may be "Straight chains"



or "Cyclics" such as



These silicone polymers have been made in various chain lengths and are available as DC 200 fluids in a range of viscosities. Of special interest to rubber

Appearance of Silastic after mastication on a two-roll mill

chemists, are the mold release fluids that have been found so useful recently in the molding of practically all kinds of organic rubbers. These fluids, being largely inorganic in their composition, are not absorbed by rubber. On the other hand they do wet and lubricate metal molds exceptionally well, and usually are retained on the metal surface for several molding cycles.

Very large silicone molecules of the straight chain type can also be given elastic properties by cross linking them. Various mineral fillers are used to improve or to control strength as well as some other properties.

Silicone Elastomers

Silastic is an almost entirely inorganic synthetic elastomer. It looks, feels, and, with one notable exception, behaves like natural and synthetic organic rubbers. That notable exception in behavior is that Silastic retains its rubber-like properties at temperatures far above and below the serviceable limits of natural or synthetic organic rubbers.

Silastic is also basically different from most other rubbers in its chemical structure. Natural and other synthetic organic elastomers all have the same molecular skeleton consisting of a carbon to carbon linked chain with a certain degree of unsaturation. Since these carbon chains are unstable to oxidation and other forms of deterioration, especially at elevated temperatures, organic rubbers either melt or harden at temperatures above 250°F. The silicone elastomers are exceptional in that they are built on a chain of alternate silicon and oxygen atoms. It is this inorganic skeleton which imparts to Silastic its remarkable heat stability.

All rubbers are vulcanized or cross-linked to provide the final product with elasticity. Vulcanization is normally done with sulfur, which reacts with the organic polymers at the unsaturated points of the carbon chain to cause cross linking. Any unsaturation which remains after vulcanization is in part responsible for the lack of stability in organic rubbers.

Silastic stocks must also be vulcanized or cross linked to acquire elasticity but the process of vulcanization is entirely different because the silicone polymer is saturated and there are no places in the molecular structure which can be cross linked by conventional methods. Therefore, special techniques have had to be developed to produce the cross linkages upon which the property of elasticity depends. Because the silicone polymer is saturated, the completion of the curing process following vulcanization requires higher temperatures and longer periods of time than are necessary to vulcanize and cure organic types of rubber.

When the process is completed, however, there is no unsaturation in the molecular structure of Silastic which is vulnerable to attack by reactive agents. That fact contributes largely to the exceptional heat stability and oxidation resistance of Silastic.

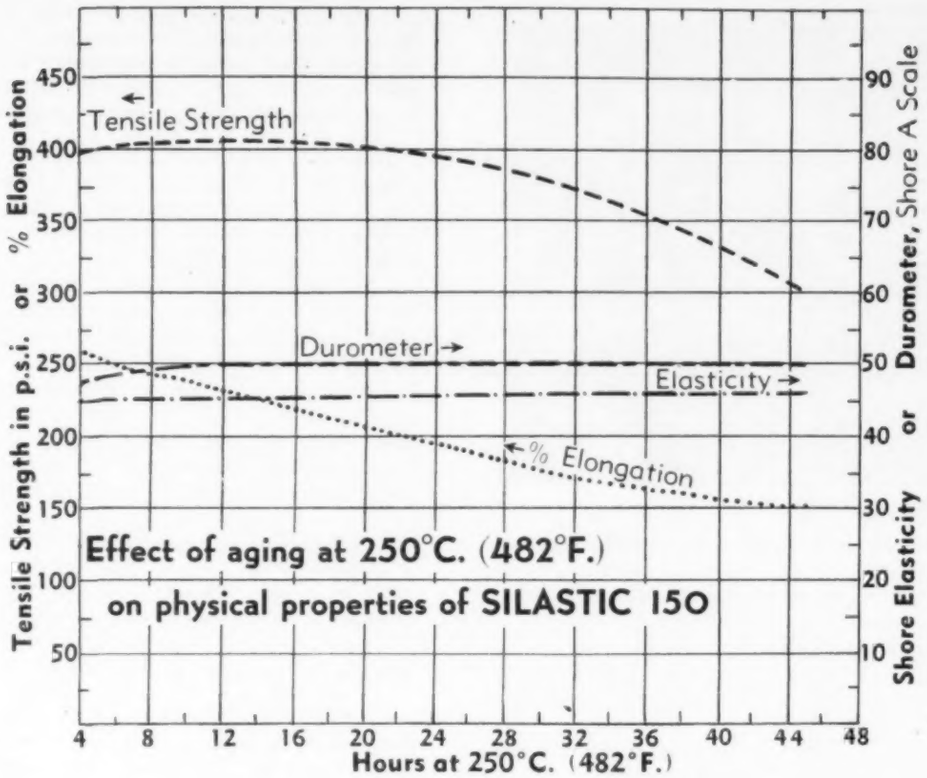
Silastic stocks are produced fully compounded and ready for use in the form of crepes and pastes. These crepes are soft, doughy, and somewhat elastic materials, designed for molding, sheeting, friction calendering or extruding. The Silastic pastes have the consistency of an ointment or salve and are designed for coating and laminating applications. When properly applied and cured, they possess rubber-like properties similar to those of the cured Silastic crepes.

Properties of Silastic

Heat Resistance: The temperature limitations of natural rubber have long been realized and many attempts have been made to impart to synthetic rubbers the quality of increased thermal resistance. In many instances, these efforts have been successful in raising the safe operating limits of rubber or synthetic rubbers. However, demands for elastic materials which would remain resilient and not soften or harden at temperatures above 250°F. remained largely unsatisfied until Silastic was introduced.

Silastic shows only slight changes in its rubber-like properties from —70°F. to over 500°F. This temperature stability is due to the inorganic structure of the silicone polymer and is a property of silicones in general. For example, the temperatures commonly used for oven aging of organic rubbers vary from 160°F. to 250°F. To test Silastic, temperatures from 300°F. to 500°F. are necessary because no appreciable changes in physical properties can be observed even

Oven curing of molded and extruded Silastic shapes.



Evidence of the heat stability of Silastic.

after prolonged exposure to the lower temperatures at which accelerated testing is usually done.

Evidence of the exceptional heat stability of Silastic is the small percentage of weight lost after exposure to temperatures of 480°F. in a circulating air oven:

Hours at 480° F.	*Per Cent Weight Lost*
2	0.3
27	1 to 2
52	1.5 to 3

Weight loss on aging at 300°F. to 400°F. is negligible.

Further evidence of the heat stability of Silastic is given in the accompanying graph which shows the changes in the properties of a typical sample of Silastic after aging for 45 hours in a circulating air oven at 250°C. (482°F.). It will be noted that hardness and elasticity remain essentially constant, tensile strength increases slightly and then shows a gradual decrease, and per cent elongation decreases slowly. The values plotted were determined at room temperature after exposure to a temperature of 250°C. (482°F.) for various periods of time.

Oven aging tests give a good indication of the life of a rubber under actual service conditions. The measurement of properties of the rubber at higher temperatures is also significant and such measurements are being made. Tests indicate that Silastic products can stand continued exposure to temperatures of 300°F. and that they will withstand, for some time, temperatures of over 500°F.

All Silastic formulations decompose at flame temperatures. Some types ignite with difficulty and continue to burn slowly, others do not support combustion.

Compression Set: The heat stability of properly cured Silastic formulations is also shown by their resistance to compression set even at elevated temperatures. Standard samples of the silicone rubbers when compressed to 75 per cent of their original thickness and held under that compression for 6 hours at 300°F. regained 87 to 94 per cent of their original thickness on release of the compression.

Cold Resistance: Plasticizers are often added to organic elastomers to improve their low temperature properties. Silastic contains no added plasticizer, and yet it remains flexible at temperatures as low as —70°F. even after exposure to that temperature for as long as 24 hours. Some Silastic formulations can be subjected to dry ice temperatures for short periods of time and still remain flexible. Hardness is only slightly increased at temperatures down to —65°F.

The low temperature flexibility of Silastic is an inherent property of the silicone polymers and not a result of special formulation. Since there is no plasticizer present to be driven off or dissolved, low temperature flexibility is not decreased by heating the rubber at elevated temperatures or by exposing it to solvents. In other words, low temperature flexibility and high temperature resistance are coexistent properties of Silastic and one is not obtained at the expense of the other.

Resistance to Deterioration: All of the data concerning the heat stability of Silastic is also an indication of its high order of oxidation resistance. Tests have also indicated a notable resistance to both ozone and ultraviolet radiation. Results secured in a Weatherometer show Silastic to be very stable under the combined

TABLE I—PHYSICAL PROPERTIES OF SILASTIC

(Cured for 48 hrs. @ 390° F.)

Type	Paste		Crepe			
Silastic Stocks	120	125	150	160	167	180
Density (@ 25° C.)	1.7	1.7	1.9	2.1	2.0	1.6
Hardness (Shore A Scale)	50–60	40–50	45–55	55–65	55–65	75–85
Tensile Strength (psi)	500	400	400	600	600	700
Elongation (%)	150	200	300	200	110	75
% Impact Resilience *	45	52	53	52	54	47
Flex (DeMattia, Method B)						
% of Elongation	50	50	70	50	20	20
No. of Cycles	500,000	500,000	250,000	150,000	80,000	7,000
% Water Absorption †	1.4	2.8	2.6	0.9	1.3	0.5
Water Absorption (m/sq. in.) †	20	39	47	17	25	7

* Bashore Resiliometer. † After 7 days immersion at room temperature.

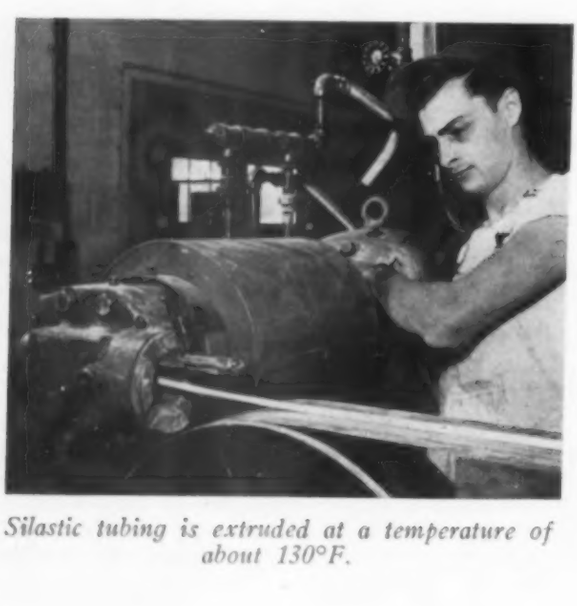
action of water and ultraviolet. Outdoor tests in progress for over a year indicate exceptional resistance to deterioration due to weathering.

Adhesion: Silastic is not corrosive to metals and adheres well to glass, ceramic, and steel surfaces. Adhesion to magnesium, brass, and aluminum is relatively weak. Silastic coating stocks adhere more tenaciously than molding stocks, and afford protection from oxidation, oil, moisture, and some chemicals. Cured Silastic, however, does not adhere to metal surfaces under service conditions.

A film of water will not form over the surface of Silastic because of the highly water repellent nature of this silicone rubber. Consequently, a sheet of ice forms with difficulty and is easily dislodged because of the lack of adhesion between the Silastic surface and the ice.

Tear Resistance: The tear resistance of Silastic is low compared to that of most other rubbers. However, when reenforced with such materials as glass or asbestos cloth it has greatly improved tear resistance. The use of such assemblies makes it possible to solve problems which demand high tear resistance as well as high temperature resistance.

Abrasion Resistance: The abrasion resistance of Silastic is not as high as that of most other rubbers.



Silastic tubing is extruded at a temperature of about 130°F.

A synthetic tread stock, formulated to have exceptional abrasion resistance, for example, has about four times as much resistance to wear as Silastic according to measurements made on a Taber Abraser. Silastic, quite obviously, is not intended for use as tread stock.

General Properties: The physical properties of various types of Silastic (Table I) were determined on flat molded sheets cured to develop optimum values. Most of the values were determined according to A.S.T.M. specifications.

It is quite apparent from a study of the figures given in Table I, that Silastic in its present stage of development has relatively low tensile strength and elongation at room temperature. These properties are related to low tear and abrasion resistance compared with most natural and synthetic organic rubbers at the relatively low service temperatures for which organic rubbers are recommended. However, the difference between the serviceable temperature limits of Silastic and organic rubbers minimizes the importance of a comparison of such properties at room temperatures.

Resilience of Silastic measured on a Bashore Resiliometer and Elongation Flex Life (De Mattia, Method B) compare favorably with similar values for organic rubbers. The per cent water absorption of Silastic is also comparable to that of organic rubbers.

Electrical Properties: Among the types of Silastic now available there is a fairly wide range of electrical properties (see Table II). These properties were determined according to A.S.T.M. specifications on molded sheets of Silastic

One of the major advantages of Silastic as an insulating material is that it does not carbonize on exposure to elevated temperatures. It is exceptionally resistant to tracking on flashover and has almost infinite surface resistance even under conditions of 100 per cent humidity. These properties combined with weatherproofness and water repellency enable Silastic to retain its electrical properties under most severe service conditions. No appreciable change in dielectric strength, for example, was noted after allowing a sample of Silastic to stand in water for 8 days.

Chemical Resistance: The chemical resistance of molded samples of Silastic (Table III) has been determined according to A.S.T.M. D-543-43. The reagents used were selected as representative of the various classes of solvents and chemicals.

Some of the Silastic types do not have unusual chemical resistance. Silastic 180, however, has good resistance to a wide variety of chemicals. In general, none of the Silastic formulations are injured by aqueous, neutral, or ammonical reagents or by strong sodium hydroxide solutions. Solvents such as acetone and alcohol have very slight effect on them. Weak alkalies and strong acids attack most types of Silastic. Solvents such as toluene, gasoline, Stoddard solvent, and chlorinated hydro-carbons cause considerable swell-

TABLE II—ELECTRICAL PROPERTIES OF SILASTIC

Type	120	125	150	160	167	180
Dielectric Constant, 10^6 cycles	7.5	7.5	5.6	9.0	9.8	4.6
Per Cent Power Factor, 10^3 cycles	0.6	0.6	1.3	0.8	0.4	0.6
Per Cent Power Factor, 10^6 cycles	0.1	0.1	1.0	2.0	0.1	0.3
Dielectric Strength (volts per mil)	1100	1100	500	500	500	650

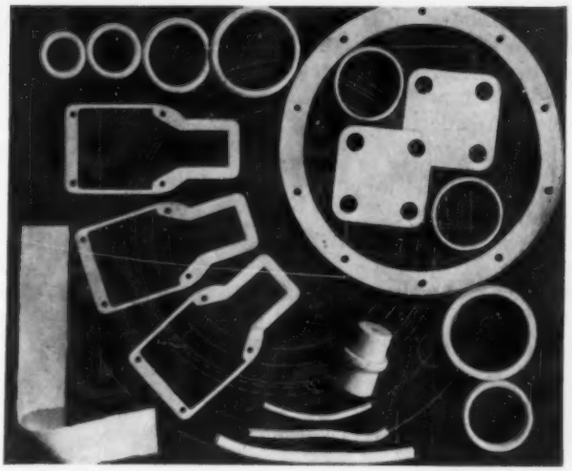
ing of all Silastic samples. However, after the solvent evaporates, they return to their original weight and volume and regain practically all of their original properties. All of the types are very resistant to mineral oil.

Fabrication of Silastic

Although almost entirely inorganic, Silastic stocks can be handled, in most respects, like compounded rubber. They can be molded, extruded, laminated, or coated by adapting conventional processes and using standard equipment. After a forming operation, Silastic stocks are cured by heating in air ovens to complete a reaction similar to vulcanization. This heating develops optimum properties in the finished product. Silastic stocks are furnished compounded and ready for use in a variety of formulations, each designed to produce optimum physical properties for its hardness.

Molding: Moldings can be made from Silastic crepes or pastes. The crepe is easier to handle, however. Silastic must be placed in cold (room temperature) molds, press cured at temperatures between 212° and 300°F. for 3 minutes, and cooled to at least 100°F. in the press before releasing the pressure. The use of magnesium metal or aluminum plates is recommended in making flat sheet moldings because no mold release agents are necessary. If other metals, especially steel, are used, release agents are necessary. Heating under pressure produces a reaction similar to vulcanization which gives permanent shape to the molding and permits handling. Molded pieces are then oven cured to develop the various degrees of strength, elasticity, and compression set associated with the hardness of the Silastic stock used.

Laminating: Any of the Silastic stocks can be used to fabricate laminated moldings. In general, the pastes are recommended for thin moldings, especially those in which only one thickness of fabric is used. A thin coating of paste is spread on both sides of the fabric to be laminated. It is not necessary to spread the paste uniformly since even distribution is accomplished by the flow which results when the assembly is compressed. For thicker laminates the use of sheeted Silastic stocks between layers of glass or asbestos cloth is recommended. Fabrics friction calendered with Silastic can also be used to assemble a laminate.

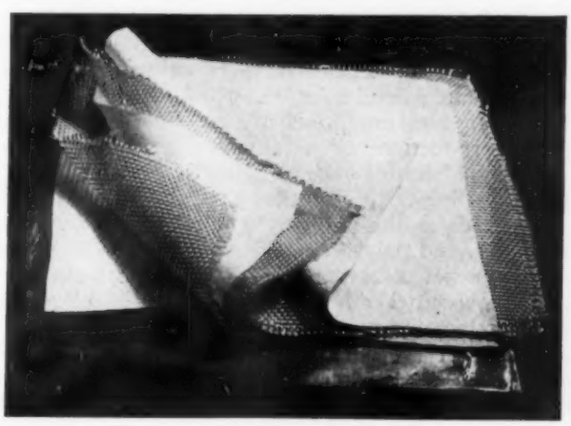


View of a number of typical molded, extruded and laminated Silastic products.

Extruding: Silastic in the form of crepes is adapted to extrusion into various shapes and over wire in conventional rubber extruders. These stocks should be masticated on a two-roll mill at a temperature below 100°F. prior to extrusion. The head of the extruder should be heated so that the extrusion is at approximately 130°F. as it leaves the die. The extrusion is quite tender at this point and must be handled carefully.

Coating: Satisfactory coatings using the pastes can be applied to glass, ceramic, or steel surfaces and to glass and asbestos cloth by doctoring, spreading, roller-coating, dipping, or spraying. The pastes can be used as received or thinned to the proper consistency with such solvents as petroleum ether or toluene.

Coatings of the desired thickness can be built up by applying a succession of thin, uniform layers, each of



Laminations are made of sheeted Silastic and glass cloth.

TABLE III—CHEMICAL RESISTANCE OF SILASTIC

Type	120	125	150	160	167	180
Water	G	G	G	G	G	G
Hydrogen Peroxide—3%	G	G	G	G	G	G
Ammonium Hydroxide—10%	G	G	G	G	G	G
Ammonium Hydroxide—Conc.	F	F	G	G	G	G
Sodium Hydroxide—10%	P	P	F	P	P	G
Sodium Hydroxide—50%	G	G	G	G	G	G
Sodium Carbonate—2%	G	G	G	G	G	G
Sodium Chloride—10%	G	G	G	G	G	G
Sulfuric Acid—10%	P	P	P	P	P	G
Sulfuric Acid—Conc.	P	P	P	P	P	G
Nitric Acid—10%	F	F	G	G	P	G
Nitric Acid—Conc.	P	P	P	P	P	F
Hydrochloric Acid—10%	F	F	G	F	P	G
Hydrochloric Acid—Conc.	P	P	P	P	P	F
Acetic Acid—5%	G	G	P	F	G	G
Acetic Acid—Conc.	G	G	P	P	G	G
Toluene	P	P	P	P	P	P
Acetone	G	G	G	F	F	G
Gasoline	P	P	P	P	P	P
Stoddard Solvent	P	P	P	P	P	P
Mineral Oil	G	G	G	G	G	G
Carbon Tetrachloride	P	P	P	P	P	P

Note: In determining the ratings given above, the following standards were observed. Resistance is called "Good" if the test samples show a change of not more than 10 per cent in weight or volume and if they retain at least two-thirds of their original Shore Efficiency. Resistance is called "Fair" if the test samples show a change of not more than 20% in weight or volume and if they retain at least one-third of their original Shore Efficiency. Resistance is called "Poor" if the above standards are not met. In every case due consideration was also given to the appearance of the test samples.

which is separately cured. Continuous coating operations are not difficult to perform when such variables as rate, thickness, consistency, and curing temperatures are adjusted properly. Fabrics can also be coated by friction calendering.

Curing: Because of its heat resistant nature, higher temperatures and longer curing periods are necessary to completely develop the properties of Silastic. Temperatures as high as 480°F. are required to produce minimum compression set in a reasonable length of time. If a product having maximum elasticity and flexibility is required, curing can be done at temperatures as low as 250°F. but longer periods of time are necessary.

Applications for Silastic Products

Among the many applications already established for Silastic products are: heat resistant gaskets, diaphragms, valve disks and packings, Silastic gaskets reinforced with glass or asbestos fabric; Silastic coated conveyor belts for services requiring heat resistance; Silastic tubing and hose; high temperature rollers, press pads and vibration mountings; Silastic embedded transformers; Silastic insulated lead wire resistant to heat, cold, oxidation, carbonization and moisture; Silastic coated glass tapes for electrical applications; Silastic coatings for the insulation of fixed wire wound resistors and heating elements; and protective coatings for metals.

Conclusions

Silastic is not competitive with natural or synthetic organic rubbers except in applications requiring rubber-like properties at temperatures both above and below the service limits of organic rubbers or involving maximum resistance to oxidation and carbon tracking.

A recognition of the limitations of Silastic at its present stage of development will prevent misuse of this almost entirely inorganic silicone rubber. Those limitations, however, do not lessen the usefulness of silicone rubber in the wide variety of applications already found for it or place serious obstacles in the way of developing many potential applications.

Report on Plastics in Germany

THE advances made in the production and application of plastics in Germany during the war period 1939-45 were recently surveyed by Gordon M. Kline, Chief of the Organic Plastics Section of the National Bureau of Standards, Washington, D. C., during a three-month investigation conducted under the auspices of the Office of the Chief of Ordnance of the U. S. War Department. A report of this survey, a summary of which is given below, was recently issued by the Office of the Publication Board, U. S. Department of Commerce, as publication "O. P. B. No. 8, Plastics in Germany."

Important centers of plastics research and development in that country were visited, including the plants of I. G. Farbenindustrie, in Ludwigshafen, Leverkusen, Uerdingen, Hochst, and Gendord; Dynamit, in Troisdorf/Koln; Rohm and Haas, in Darmstadt; Alexander Wacker, in Munich and Burghausen; Th. Goldschmidt, in Essen; and Gunther-Wagner, in Hanover.

German manufacturing processes and fabricating technics are well advanced. Their engineers have placed great emphasis on development of continuous processes for the preparation of the raw materials and their conversion into plastics. Four methods of polymerization have been utilized: block or mass, emulsion, pearl or granular, and solution.

German plastic materials are as diversified as our own, but production is generally on a smaller scale than in the United States. Particularly interesting are the various copolymers, which they have found to be useful in such fields as the polyvinyl chlorides, polyacrylates, polyamides, and polystyrenes. Among the new or less well-known polymers that they have been manufacturing are polyvinyl ethers, polyvinyl carbazole, polyethyleneimine, and polyurethanes. In the condensation resin field, special compositions and catalysts have been developed for phenolic, urea, melamine, aniline, and alkyd resins. A new resin was prepared during the war from acetylene and butyphenol for use in improving the working properties of synthetic rubber.

A dry-processed, unplasticized, polyvinyl chloride film, called Luvitherm, is of particular interest. The polyvinyl chloride is rolled and calendered at 165°C., heated for a few seconds at 260°C., and stretched on a roll heated to 120°C. The film of 1.0 to 1.4 mils thickness cannot be heat-sealed easily because of its high tack point, but can be cemented with cyclohexanone or tetrahydrofurane. An important application is its use as a recording tape, coated with a solution of magnetic iron oxide and a vinyl copolymer. These tapes were in general use on German radio networks and for military communications.

The polyurethanes are a new development in the plastics field and are not on the market in the United States. In general, they are produced by the reaction of polyisocyanates with polyhydroxy compounds, such as polyesters. They were in use in Germany for the manufacture of fibers, bristles, adhesives, artificial leather, injection molding compounds, and plastic foams.

The polyvinyl ethers are not made in the United States on a large scale, but were being manufactured in Germany during the war at the rate of approximately 600 tons a month. These polymers are used as lacquer constituents, adhesives, and impregnating agents for paper and textiles.

Polyethyleneimine was made at the rate of about four tons a month for use as a paper impregnant. It greatly improves the wet strength and scuff resistance of soft crepe paper. It does not detract from the absorbent qualities, hence it was used for towels, bandages, and shoe insoles.

The German army used plastics for many of the same purposes as our own military, for example, signal wire insulation, ammunition fuses, map paper impregnant, gas mask parts, and anti-gas protective clothing. In addition, scarcity of leather, rubber, and other natural products in Germany had led to many civilian uses, such as shoe soles, bicycle tires, motor-drive belts, harness laces, battery cases, artificial leather, and protective coatings.

Swelling of Rubber

I—A Study of Reclaiming Oils with Regard to Swelling Action on GR-S and Natural Rubber

By KATHLEEN S. ROSTLER and RICHARD M. WHITE

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THE purpose of this investigation was to contribute to basic knowledge on the current problem of reclaiming mixed scrap a primary orientation on behaviour of oils available for reclaiming purposes.

According to present knowledge the reclaiming of GR-S scrap and natural rubber scrap separately is feasible, and the most widely accepted recommendation for dealing with the problem of mixed scrap is careful marking and careful sorting of the scrap, which can then be reclaimed separately *(1)*. It is obvious that this painstaking procedure will not only be prohibitive to the production of a low-priced reclaim, but in some cases will be actually impossible.

A reclaiming procedure equally effective for GR-S and natural rubber scrap would eliminate the necessity for separating the scrap, and, consequently, open a way to a more economical procedure for dealing with mixed scrap. Aiming at this solution from the viewpoint of using an effective reclaiming oil, it was thought important to gather basic information on the influence of various oils on the two types of scrap. It can be assumed that the effectiveness of an oil in reclaiming depends primarily on its effectiveness in swelling the scrap. Many data are available in the literature on swelling of natural rubber *(2)*, but very little has been published on GR-S *(3)*. This investigation deals with the correlation of physical and chemical characteristics of reclaiming oils with their swelling effect on vulcanized GR-S and natural rubber.

This paper, being a preliminary report, cannot attempt at a solution of the problem; it does not present more than suggestions for further work.

Scope of Investigation

Five groups of oils were selected for investigation. These oils were chosen to represent the types of oils most likely to be of practical interest in reclaiming from the viewpoints of price and availability in volume, and also to promise characteristic and specific differences in behaviour. These groups were as follows:

1. Saturated hydrocarbon oils.
2. Oils of predominately unsaturated hydrocarbon character.
3. Oils of predominately aromatic character.

Note: This paper was awarded second prize in the contest sponsored by the Chicago Rubber Group under the title of "On the Utilization of Cured Synthetic Rubber Scrap." A condensed version of the paper was presented before the group at a meeting held on January 25, 1946, at Chicago, Ill.

RECLAIMING OILS USED IN INVESTIGATION

Oil No.	*Type or Brand Name*	*Supplier*
1	Normal Heptane	Westvaco Chlorine Products Corp.
2	Amsco Light Retardsol	American Mineral Spirits Co.
3	Atlantic Stabilized 85 White Oil	Atlantic Refining Co.
4	Amsco-Solv A	American Mineral Spirits Co.
5	Amsco-Solv F	American Mineral Spirits Co.
6	Naftolen 510	Wilmington Chemical Corp.
7	Benzene, Purified	J. T. Baker Chemical Co.
8	Reclaiming Oil No. 1621	Barrett Div., Allied Chemical & Dye Corp.
9	Steam-Distilled Wood Turpentine	Hercules Powder Co.
10	Pine Tar	Zophar Mills, Inc.
11	Acetone Oil	Eastman Kodak Co.
12	Isophorone	Carbide & Carbon Chemicals Corp.
13	Amsco Lactol Spirits	American Mineral Spirits Co.
14	Amsco Mineral Spirits	American Mineral Spirits Co.
15	Amsco-Solv D	American Mineral Spirits Co.
16	Unsaturated petroleum fraction of medium viscosity prepared in laboratory of University of Delaware from a California crude oil	
17	Wilcor 151	Wilmington Chemical Corp.
18	Multi-Plast	Wilmington Chemical Corp.
19	Unrefined petroleum distillate in the gas oil range from a California crude oil	
20	Wilcor 111	Wilmington Chemical Corp.
21	Naftolen LV	Wilmington Chemical Corp.
22	Unrefined lubricating oil fraction of mid-continent crude	
23	Unsaturated petroleum fraction of a high viscosity prepared in laboratory of University of Delaware from mid-continent crude	
24	Naftolen R-100	Wilmington Chemical Corp.

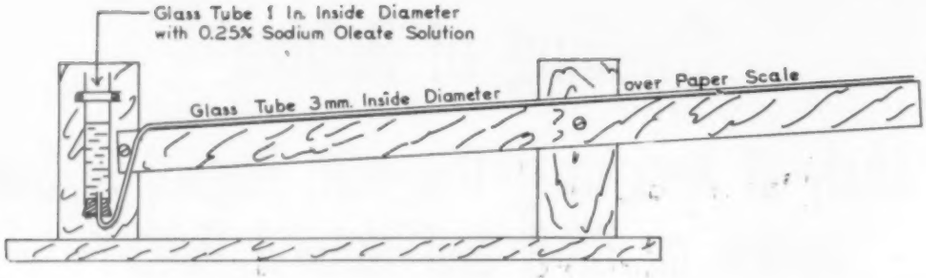

Figure 1.

4. Oils of predominately terpene character.
5. Oils of predominately ketone character.

Representative oils of these five groups were investigated as to their swelling effect on test compounds of GR-S and natural rubber (smoked sheets). The influence of the boiling range of the oils on swelling power, on penetration, and on recovery after swelling was observed with oils of the first two groups. Tests were also made on the influence of degree of unsaturation on swelling power.

Test Methods

For identifying the oils under investigation analytical methods were selected which can easily be employed in every laboratory for control purposes, and which at the same time are considered characteristic and specific enough to define the oils.

Boiling range was measured, and initial boiling point, 50% point and end point recorded. Where distillation at atmospheric pressure was impractical or impossible the distillation was carried out at 10 mm. Hg. The boiling range converted to atmospheric pressure* is reported in the tables for the purpose of classifying the oils on the same level. Specific gravity was determined with a pycnometer at 60°F.

As measures of unsaturation were taken the aniline point of a 1:1 mixture by volume with normal heptane and the per cent soluble in two volumes of cold concentrated sulfuric acid. In the case of heavy viscous oils the solubility in sulfuric acid was measured in dilution with a low viscosity saturated hydrocarbon. It has to be borne in mind that there is no direct relationship between the mixed aniline point and the solubility in sulfuric acid. While high solubility in cold sulfuric acid is an indication of high proportion of hydrocarbons containing double bonds, low aniline point is an indication of low proportion of paraffinic hydrocarbons, but does not give any information as to the actual percentage or as to the nature of the other hydrocarbons present.** These two tests should be considered only as a relative measure and significant only for hydrocarbon oils of related groups and the same boiling range.

The two rubber compounds shown below were used for swelling tests. As can be seen from their composition and physical data they are representative of the type of compound found in tire tread. Five parts pine tar were used in these compounds in spite of the fact that at least part of it will be extractable, since all scrap reaching the reclaimer will contain a certain amount of an extractable processing aid.

* Boiling point °C. at 10mm + 145° C. = boiling point at 760mm.
** For a more detailed discussion of the significance of the aniline point see Ellis, "The Chemistry of Petroleum Derivatives," Vol. I, p. 1136, and original references cited therein.

TABLE I

Oil No.	Designation	Type of Oil	Sp. Gr.	Boiling Range			% Swelling 48 hrs., 60°C.		% Swelling 24 hrs., 25°C.	
			60/60	Initial B. Pt.	50% Point	End Point	GR-S	Smoked Sheets	GR-S	Smoked Sheets
1	Normal heptane	Saturated	0.68	98°C.	98°C.	98°C.	95	160	95	150
2	High-boiling petroleum naphtha	Saturated	0.76	180°C.	195°C.	210°C.	*130*	*160*	—	—
3	Liquid paraffin	Saturated	0.86	310°C.*	360°C.*	430°C.*	*60*	*140*	—	—
4	Low-boiling unsaturated petroleum solvent	Unsaturated	0.78	95°C.	100°C.	130°C.	225††	270††	280	275
5	High-boiling unsaturated petroleum solvent	Unsaturated	0.85	175°C.	195°C.	215°C.	*255*	*290*	—	—
6	Medium-viscous unsaturated petroleum oil	Unsaturated	1.01	330°C.**	370°C.**	445°C.**	*270*	*185*	—	—
7	Benzol	Aromatic	0.87	80°C.	80°C.	80°C.	265††	275††	275	220
8	Coal tar oil	Aromatic	0.90	160°C.	175°C.	210°C.	350††	400††	—	—
9	Turpentine	Terpene	0.86	140°C.	155°C.	195°C.	—	—	285	270
10	Pine tar	Terpene	1.02	215°C.†	400°C.†	455°C.†	*75*	*55*	—	—
11	Acetone oil	Ketone	0.82	70°C.	90°C.	145°C.	—	—	90	75
12	Isophorone	Ketone	0.91	195°C.	210°C.	220°C.	—	—	130	110

* Calculated boiling range. Measured at 10mm. Hg: I.B.P., 165° C.; 50%, 215° C.; End, 285° C.
** Calculated boiling range. Measured at 10mm. Hg: I.B.P., 185° C.; 50%, 225° C.; End, 300° C.
† Calculated boiling range. Measured at 10mm. Hg: I.B.P., 70° C.; 50%, 255° C.; End, 310° C. (85% = End Point).
†† Results somewhat falsified by tendency of the compound to dissolve in the oil.

TABLE II

Oil No.	Designation	Boiling Range: Initial B. Pt.	Boiling Range: 50% Point	Boiling Range: End Point	% Swelling: Small Samples: GR-S	% Swelling: Small Samples: Smoked Sheets	% Swelling: Large Samples: GR-S	% Swelling: Large Samples: Smoked Sheets	Type of Oil
1	Heptane	98°C.	98°C.	98°C.	95	160	—	—	
13	Low-boiling petroleum naphtha	95°C.	105°C.	130°C.	130	180	—	—	Saturated
14	Medium-boiling petroleum naphtha	150°C.	175°C.	205°C.	160	220	—	—	hydrocarbons
2	High-boiling petroleum naphtha	180°C.	195°C.	210°C.	*130*	*160*	115	180	
3	Liquid paraffin	310°C.*	360°C.*	430°C.*	50	115	*20*	*50*	
4	Low-boiling unsaturated petroleum solvent	95°C.	100°C.	130°C.	*225*	270	—	—	
15	Medium-boiling unsaturated petroleum solvent	150°C.	180°C.	210°C.	240	265	—	—	Oils of
5	High-boiling unsaturated petroleum solvent	175°C.	195°C.	215°C.	*255*	*290*	*245*	*260*	predominantly
16	Low-viscous unsaturated petroleum oil	250°C.**	335°C.**	455°C.**	*230*	*250*	*165*	*175*	unsaturated
17	Low-viscous unsaturated petroleum oil	195°C.†	360°C.†	480°C.†	*180*	*180*	*65*	*70*	hydrocarbon
18	High-viscous unsaturated petroleum oil	360°C.††	395°C.††	465°C.††	*70*	*90*	—	—	character

* Calculated boiling range. Measured at 10mm. Hg: I.B.P., 165° C.; 50%, 215° C.; End, 285° C.
** Calculated boiling range. Measured at 10mm. Hg: I.B.P., 105° C.; 50%, 190° C.; End, 310° C.
† Calculated boiling range. Measured at 10mm. Hg: I.B.P., 50° C.; 50%, 215° C.; End, 335° C.
†† Calculated boiling range. Measured at 10mm. Hg: I.B.P., 215° C.; 50%, 250° C.; End, 320° C.

	A	B
GR-S	100.00	0.00
Smoked sheets	0.00	100.00
Stearic acid	1.00	1.00
Sulfur	2.00	2.00
Pine tar	5.00	5.00
MPC black	45.00	45.00
Zinc oxide	5.00	5.00
Benzothiazyl disulfide	1.50	1.50
Diphenylguanidine	0.25	0.25
Cure at 45 lbs.	50′	50′
Shore hardness	55	60
300% modulus (psi)	650	1000
500% modulus (psi)	1550	2300
Tensile at break (psi)	2900	3550
Elongation at break (%)	700	650
Set at break (%)	30	35

Two sizes of specimen were used in the tests having approximately the following dimensions:

(1) 4.5cm x 2cm x 0.2cm
(2) 3cm x 1cm x 1cm

The first set was cut from slabs cured in the standard A.S.T.M. mold for tensile slabs. The second set was cut to size from 10mm. thick rectangular blocks.

Swelling tests at elevated temperature were run by suspending the test specimens on a fine wire for 48 hours in the oils under investigation, maintaining the temperature at 60°C. in a constant temperature bath. Reflux condensers were used with volatile oils. Volume of the test specimens before and after the test was measured with the immersion device illustrated in Figure 1†. After removing from the swelling liquid, rubber test specimens were washed in petroleum ether by dipping ten times, wiped with a clean cloth, dipped twice in alcohol and again wiped dry before measuring.

With those oils where these conditions of elevated temperature caused disintegration of the rubber, or appeared to be too severe in other respects, tests were run in a similar manner for 24 hours at room temperature (25°C.).

It was found with the tests at elevated temperatures that carefully controlled procedure had to be used in handling of the samples in order to obtain closely reproducible results. Tests reproducible within ±5% could be obtained only when the rubber test specimens were allowed to cool overnight in the oil before measuring††. When test specimens were taken out of the oil, cooled in air, and measured one to two hours after completion of the swelling period, results were not reproducible more closely than about ±10%.

† The device is a modification of the instrument described in the 1942 "Vanderbilt Rubber Handbook," p. 321, the main change being a substitution of a glass tube for the brass tank in order to be able to observe that no air bubbles are sticking to the submersed specimen.
†† Measurements carried out with these precautions and considered reproducible within ± 5% are italicized in the tables of data.

Description of Experimental Work

(A) Effect of Oil Type on Swelling: Representative samples of each of the five types of oils studied were compared as to swelling effect on the smoked sheets and GR-S compounds given above. Results of the swelling tests, together with descriptions of the oils, are presented in Table I.

(B) Effect of Boiling Range on Swelling and Penetration: The next series of tests dealt with testing of

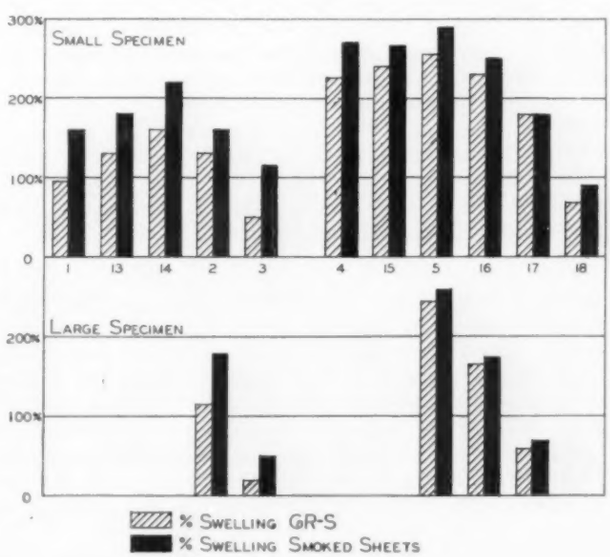

Figure 2.

TABLE III

Oil No.	Designation	Sp. Gr. 60/60	Boiling Range: Initial B. Pt.	Boiling Range: 50% Point	Boiling Range: End Point	Mixed Aniline Point	% Soluble in H_2SO_4	% Swelling 48 hrs., 60°C.: GR-S	% Swelling 48 hrs., 60°C.: Smoked Sheets
13	Low-boiling petroleum naphtha	0.71	95°C.	105°C.	130°C.	64.5°C.	2%	130	180
4	Low-boiling unsaturated petroleum solvent	0.78	95°C.	100°C.	130°C.	42.0°C.	40%	225	270
14	Medium-boiling petroleum naphtha	0.77	150°C.	175°C.	205°C.	60.0°C.	15%	160	220
15	Medium-boiling unsaturated petroleum solvent	0.83	150°C.	180°C.	210°C.	38.0°C.	55%	240	265
2	High-boiling petroleum naphtha	0.76	180°C.	195°C.	210°C.	68.5°C.	10%	*130*	*160*
5	High-boiling unsaturated petroleum solvent	0.85	175°C.	195°C.	215°C.	32.0°C.	64%	*255*	*290*
19	Unrefined fraction of California crude	0.89	245°C.[1]	295°C.[1]	345°C.[1]	58.0°C.	2%	*185*	*215*
20	Low-viscous unsaturated petroleum oil	1.02	200°C.[2]	310°C.[2]	370°C[2]	27.0°C.	21%	*210*	*210*
21	Medium-viscous unsaturated petroleum oil	0.97	265°C.[3]	315°C.[3]	415°C.[3]	29.5°C.	36%	*240*	*200*
3	Liquid paraffin	0.86	310°C.[4]	360°C.[4]	430°C.[4]	83.5°C.	0	50	115
17	Low-viscous unsaturated petroleum oil	1.00	195°C.[5]	360°C.[5]	480°C.[5]	28.0°C.	31%	*180*	*180*
6	Medium-viscous unsaturated petroleum oil	1.01	330°C.[6]	370°C.[6]	445°C.[6]	29.0°C.	46%	*270*	*185*
22	Unrefined fraction of Mid-Continent crude	0.91	355°C.[7]	395°C.[7]	445°C[7]	72.5°C.	9%	*65*	*100*
23	High-viscous unsaturated petroleum oil	1.00	345°C.[8]	395°C.[8]	465°C.[8]	34.0°C.	25%	*70*	*85*
18	High-viscous unsaturated petroleum oil	1.02	360°C.[9]	395°C.[9]	465°C.[9]	28.5°C.	48%	*70*	*90*
24	High-viscous unsaturated petroleum oil	1.02	335°C.[10]	415°C.[10]	480°C.[10]	30.0°C.	57%	*65*	*65*

[1] Calculated boiling range. Measured at 10mm. Hg: I.B.P., 100° C.; 50%, 150° C.; End, 200° C.
[2] Calculated boiling range. Measured at 10mm. Hg: I.B.P., 55° C.; 50%, 165° C.; End, 225° C.
[3] Calculated boiling range. Measured at 10mm. Hg: I.B.P., 120° C.; 50%, 170° C.; End, 270° C.
[4] Calculated boiling range. Measured at 10mm. Hg: I.B.P., 165° C.; 50%, 215° C.; End, 285° C.
[5] Calculated boiling range. Measured at 10mm. Hg: I.B.P., 50° C.; 50%, 215° C.; End, 335° C.
[6] Calculated boiling range. Measured at 10mm. Hg: I.B.P., 185° C.; 50%, 225° C.; End, 300° C.
[7] Calculated boiling range. Measured at 10mm. Hg: I.B.P., 210° C.; 50%, 250° C.; End, 300° C.
[8] Calculated boiling range. Measured at 10mm. Hg: I.B.P., 200° C.; 50%, 250° C.; End, 320° C.
[9] Calculated boiling range. Measured at 10mm. Hg: I.B.P., 215° C.; 50%, 250° C.; End, 320° C.
[10] Calculated boiling range. Measured at 10mm. Hg: I.B.P., 190° C.; 50%, 270° C.; End, 335° C.

the influence of boiling range on swelling power. Oils of varied boiling range of the first two groups were used as swelling agents with two sizes of samples to give two ratios of volume to surface area. The first set of samples had dimensions of approximately 4.5cm. x 2cm. x 0.2cm., or a ratio of volume to surface area of 1:11.5. The second set of samples had dimensions of approximately 3cm. x 1cm. x 1cm., or a ratio of volume to surface area of 1:4.7. The difference in swelling of large size and small size samples was taken as indication for the penetration power. Table II and Figure 2 report the results of the tests.

(C) Effect of Degree of Unsaturation on Swelling: Oils from groups 1 and 2 and mixtures of oils from these two groups of similar boiling range but different in degree of unsaturation as evidenced by solubility in sulfuric acid, and containing various amounts of paraffinic hydrocarbons, as evidenced by the aniline point, were tested as to the swelling effect on cured test specimens of GR-S and smoked sheets. The results are presented in Table III and Figure 3.

(D) Temporary and Permanent Swelling: In evaluating a reclaiming oil on the basis of its swelling effect on cured scrap, it should be considered that the swollen rubber is not in a state of equilibrium at the completion of the test or after a short exposure to air. The change of volume of a test specimen can only be called "temporary swelling" if measured immediately after the test specimen has been removed from the swelling liquid. This temporary swelling is characteristic of the behaviour of the rubber in the oil and in the presence of the oil in excess. When a swollen test specimen is removed from the swelling liquid and exposed to the air for a longer period of time, a shrinkage takes place. The extent of this second change in volume depends principally on three factors:

1. Compatibility of the rubber with the oil,
2. Elastic properties or recovery of the rubber,
3. Volatility of the oil.

In order to obtain figures for this behaviour the experiments reported in Table IV and Figure 4 were carried out, measuring the volume of the test specimens immediately after removal from the oil in the usual manner and again after the specimens had remained in air for seven days.*

Discussion of Experimental Results

The experimental results reported can be interpreted as follows:

(1) Paraffinic hydrocarbons swell the natural rubber scrap much more than the GR-S. This is in accordance with expectation that an isoprene polymer will swell comparatively more in a long chain hydrocarbon solvent than a polymer containing an aromatic ring.

(2) The oils of the unsaturated hydrocarbon type tested have in general greater swelling power than the oils of the saturated hydrocarbon type for both GR-S and natural rubber. The difference in per cent swelling of GR-S and natural rubber is smaller with the unsaturated than with the saturated hydrocarbon oils as shown in Table I.

Since Oils 4, 5 and 6, which were tested as representative of available oils of predominately unsaturated hydrocarbon character, are not 100% unsaturated

* Preliminary tests indicated that after seven days the volume of the rubber specimen changed only very slightly.

hydrocarbons, but contain a considerable proportion of saturated hydrocarbons, it becomes clear that the unsaturated hydrocarbons themselves have a greater swelling power for the GR-S than for the natural rubber compounds.

Small amounts of paraffinic hydrocarbons present in the oils, since they have much greater solvent power for natural rubber, tend to mask the effect of the unsaturated components in swelling the GR-S. In the case of Oil No. 6, which contains only a small amount of paraffinic hydrocarbons, the preference for swelling of GR-S is clearly visible.**

The effect of unsaturated hydrocarbons on swelling is more clearly brought out in Table III and Figure 3 which report six series of swelling tests carried out with oils of practically the same boiling range but of increasing unsaturation. The reported test data show the increasing preference for swelling GR-S over smoked sheets with increasing proportion of unsaturated components, as evidenced by greater solubility in cold concentrated sulfuric acid.

(3) The swelling agents of aromatic character tend to swell GR-S scrap more than natural rubber scrap as can be seen from the swelling test in benzol at room temperature. This is again in accordance with expectations that polymers containing aromatic rings will swell more in aromatic solvents than an isoprene polymer.

(4) Terpene-type products swell GR-S scrap perhaps slightly more than natural rubber scrap.

(5) Ketone-type products swell GR-S more than natural rubber scrap. The very low boiling oils tested of the ketone type and also of the terpene type are too powerful to be regarded as swelling agents since under any but very mild conditions, they cause the scrap to dissolve and disintegrate. However, the possibility exists that the addition of ketone-type products in small amounts to oils from the other groups could result in very useful reclaiming oils.†

(6) The results of the swelling tests on oils of hydrocarbon types of varied boiling range, reported in Table II and Figure 2, together with the results of the tests on temporary and permanent swelling, reported in Table IV and Figure 4, show a clear advantage in using oils in the medium boiling range, *i.e.*, about 300°C. to 350°C., 50% point. Oils in this range show high original swelling together with highest permanent swelling, particularly with those oils of predominately unsaturated character.

Oils of slightly lower boiling range, although they have equally high original swelling, have the disadvantage of low permanent swelling, meaning that the oils evaporate with time, and are still not of low enough boiling range and easily enough removable from the reclaim to be utilized for this temporary effect in reclaiming.

Very low boiling and very high boiling oils have lower swelling than those of medium boiling range. In addition, the unsaturated hydrocarbon oils of low boiling range do not show the preferential swelling effect on GR-S which is characteristic of this group.

High boiling oils of both the saturated and the unsaturated hydrocarbon groups have an additional disadvantage under our test conditions of poor penetration as evidenced by the difference in swelling between the large and small samples in Table II and Figure 2. However, this drawback might well disappear with the use of higher temperatures where the viscosity of the oils would be lower, especially that of the unsaturated ones, which have a steep viscosity-temperature curve.

(7) A comparison of the test results carried out with the oils of the five groups of reclaiming oils set up permits the assumption that the findings in the two hydrocarbon groups are applicable to the behaviour of the oils of the other three groups. This refers to the influence of boiling range or viscosity. However, it has to be considered that oils of these three groups have more complex composition than the hydrocarbon oils and that, as shown, each component of a reclaiming oil has its special and characteristic influence on the swelling power of the mixture.

Conclusions

It is believed that this paper gives a first orientation on the behaviour of reclaiming oils as to swelling action on GR-S and natural rubber. Oils available for reclaiming purposes have been classified into five groups, based on their chemical character, and their swelling effect

** A complete chemical analysis of Oil No. 6 discloses that it contains less than 10% of paraffinic hyd-ocarbons.

† Preliminary tests carried out in this direction using 10% admixtures of ketone-type products with oils of the other groups in the described swelling procedure at elevated temperatures supported this statement, but test results were not sufficiently exact to be reported in any of the tables.

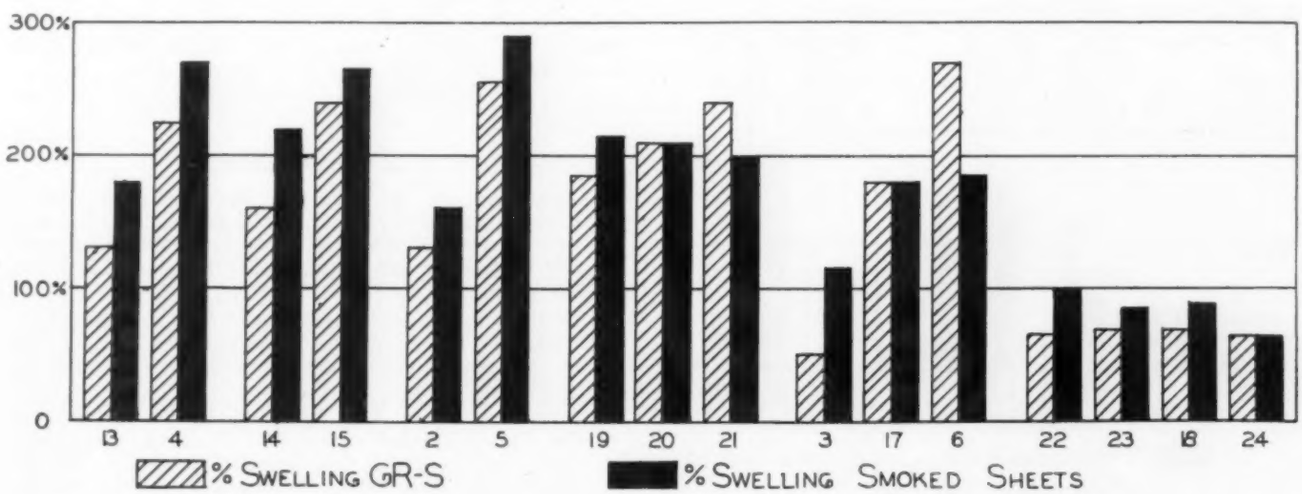

Figure 3.

TABLE IV

Oil No.	Designation	Type of Oil	Boiling Range: Initial B. Pt.	Boiling Range: 50% Point	Boiling Range: End Point	% Swelling Measured immediately: GR-S	% Swelling Measured immediately: Smoked Sheets	% Swelling Measured after 7 days: GR-S	% Swelling Measured after 7 days: Smoked Sheets
3	Liquid paraffin	Saturated	310°C.*	360°C.*	430°C.*	*20*	*50*	10	35
17	Low-viscous unsaturated petroleum oil	Unsaturated	195°C.*	360°C.*	480°C.*	*65*	*70*	60	55
16	Low-viscous unsaturated petroleum oil	Unsaturated	250°C.*	335°C.*	455°C.*	*165*	*175*	130	130
20	Low-viscous unsaturated petroleum oil	Unsaturated	200°C.*	310°C.*	370°C.*	*145*	*145*	130	130
19	Unrefined fraction of California crude	Saturated	245°C.*	295°C.*	345°C.*	*110*	*140*	95	110
2	High-boiling petroleum naphtha	Saturated	180°C.	195°C.	210°C.	115	180	15	20
5	High-boiling unsaturated petroleum solvent	Unsaturated	175°C.	195°C.	215°C.	*245*	*260*	5	10
8	Coal tar oil	Aromatic	160°C.	175°C.	210°C.	315	360	5	5

* Calculated boiling range.

on GR-S and smoked sheets has been measured and correlated with physical and chemical characteristics of the oils.

It has been shown that a variety of oils are available, having such distinctly different effects on cured GR-S and natural rubber that it is possible to select oils or combinations of oils giving any desired swelling. The swelling can be permanent or temporary, depending on the boiling range of the oils. By using a reclaiming oil giving only temporary swelling a reclaim free of plasticizing oil can be obtained; by using one giving permanent swelling and proper dosage of the oil, a reclaim of increased and stabilized plasticity can be obtained. Reclaiming oils can be selected according to their preference in swelling GR-S or natural rubber, to achieve whatever is desired—larger or smaller or equal swelling of the individual components of mixed scrap.

By using a reclaiming oil of equal swelling power for both GR-S and natural rubber, a more uniform reclaim made from mixed scrap can be expected than by using one of unequal influence on the two scrap components. It is also conceivable that by using a reclaiming oil with very distinct preference for one of the scrap components a kind of sorting of the scrap can be achieved during the reclaiming process, for instance, by retaining all the GR-S in the tailings, and then subjecting the tailings to a plasticizing or second reclaiming run.

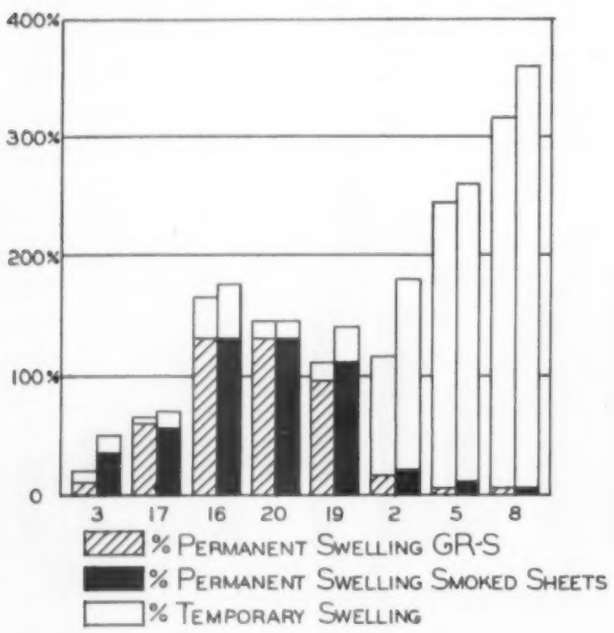

Figure 4.

According to the dual purpose of oil in reclaiming, to make vulcanized scrap thermoplastic again by plasticizing, and to swell the scrap to make the fabric easily accessible to the digesting solution, it is believed that the proper selection of a reclaiming oil can facilitate the solution of the problem of reclaiming mixed scrap.

It has been shown that the chemical composition of reclaiming oils can be correlated with their specific swelling action. It appears that an exact control of composition of a reclaiming oil is important, since small changes in the percentage of its components bring about considerable change in its swelling power.

It is believed that this study has pointed out the possibility of selecting reclaiming oils suitable for reclaiming mixed scrap without separating. Experimental reclaiming of mixed scrap is being carried out at present. The outcome of these tests will be reported later.

ACKNOWLEDGMENT

The work reported in this paper was completed in July, 1945, and is part of a research project on petroleum products in rubber being carried out at the Engineering Experiment Station of the University of Delaware under the direction of Dr. F. S. Rostler. The results of further investigation will be published as completed. The authors wish to express their appreciation to Dr. Rostler for his helpful suggestions and criticisms.

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Comparison of Latices for Tire Cord Dipping

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NOT being available, natural rubber latex has been superseded by synthetic latices and reclaim dispersions for the application of tire cord dipping. Materials currently employed for both rayon and cotton dipping include GR-S latices, Types 2 and 3, and whole tire reclaim dispersions—either by themselves or, more commonly as blends. On the subject of tire cord dipping, a survey of the literature reveals very little recent information, a gap which this paper partially attempts to fill by describing the results of a number of laboratory comparisons found quite useful as screening tests. The work falls into two general divisions—latex properties or those descriptive of the solution, and rubber properties or those characteristic of the film deposited from these solutions.

Requirements of the Treating Solution

A satisfactory cord treatment should meet a number of requirements: It should be stable to mechanical forces encountered in shipping, pumping, and stirring; should not settle or cream appreciably in storage; should not flocculate upon the addition of compounding chemicals or upon dilution to low solids; should have a low viscosity at high solids yet should readily respond to small amounts of thickeners so that the solids content and viscosity may be independently controlled; it should have good tack but should not stick to metal and processing equipment; it should be "flexible" so as not to embrittle the treated cord; should provide high cured bond strength to tire cord and to carcass stocks, which feature should be retained at elevated temperatures; and finally, it should have a high resistance to film degradation by flex fatigue. The necessity for good stress-strain properties has never been established.

Materials Examined

The latices studied in this work were:

a. Creamed natural latex having a minimum age of four years.

b. GR-S latex, Type 2, from Goodyear (Akron).

c. GR-S latex, Type 3, from U. S. Rubber (Torrance California).

d. A commercial "whole tire" reclaim dispersion prepared with 3% casein.

Tables 1 and 1A show the composition of these latices.

GR-S Type 2 latex is prepared similarly to crude GR-S *(8, 12, 15)*. Polymerization is halted by use of a short stopper (which accounts for the tan color of dried films), it contains no antioxidant and is emulsified on a fatty acid soap which results in poor tack. Its main deficiency is very poor tensile strength in both cured and uncured films. Accordingly, Type 3 was devised with a higher styrene content to give a tougher polymer. Polymerization is carried to completion in Type 3, thus necessitating no short stopper. It contains no antitoxidant and is emulsified on a rosin acid soap for improved tack. The preparation of reclaim dispersions has been described in a number of papers *(4, 13)*.

Solution Properties

Some of the elementary solution properties which govern the behavior of these latices during processing are shown in Table II. Curves describing the dependence of viscosity on total solids are shown in Figure

TABLE IA—COMPOSITION OF "WHOLE" TIRE RECLAIM DISPERSION

Acetone extract	9.2
Chloroform extract (cured)	2.5
Alkaline KOH	2.8
Water solubles	8.1
Free Carbon	10.2
Ash	18.2
Total Sulfur	1.4
Rubber Hydrocarbon (diff.)	47.6
Percent solids	51.9

TABLE I—COMPOSITION OF GR-S LATICES

Property	Type 2	Type 3
Butadiene	72	52
Styrene	28	48
Emulsified on	Fatty acid soap	Rosin acid soap
Short Stopper	0.1	0
Antioxidant	0	0
Percent solids	29	37.1
pH	8.5	10.5
Soap	3.1	4.8

TABLE II—SOLUTION PROPERTIES

Property	Notes	GR-S Type 2	GR-S Type 3	Natural Latex	Reclaim Dispersion
Mechanical Stability	a	excellent	excellent	good	variable
Dilution Stability	b	excellent	excellent	good	poor
Chemical Stability	c	very poor	poor	good	excellent
Relative viscosity 25%	..	4.56	3.43	3.38	8.86
Surface tension-dynes/cm.	d	59	51	33	36
Color	..	tan	white	white	black
Approx. particle size—mu	e	70	100	1000	....
Putrefaction	f	no	no	yes	yes

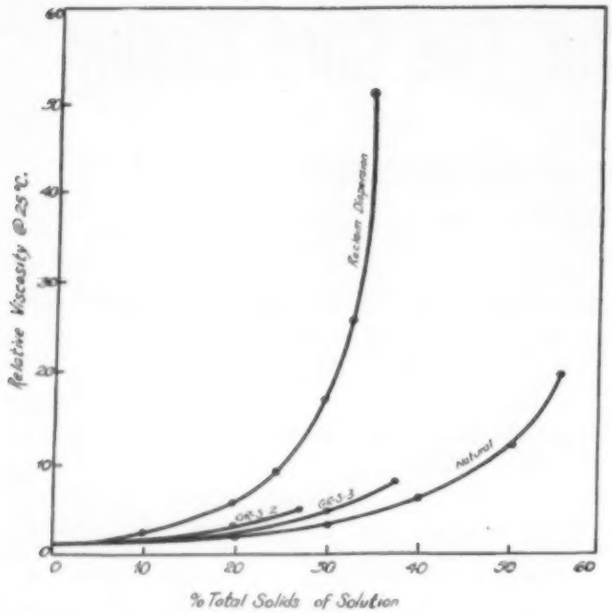

FIG. 1—Relative Viscosity

I. Only the reclaim dispersion shows undesirable thickening at the higher solids.

Casein has found increasing usage as a stabilizer and adhesive in recent years but it has one major draw back: it causes a marked thickening action on certain types of systems which in turn places a maximum on the solids content satisfactory for processing. Table III summarizes this effect.

Colloidal systems are generally sensitive to the addition of salts and chemicals such as certain vulcanizing agents. Table IV demonstrates the relative chemical stability upon the addition of electrolytes, in this case, common salt.

Notes on Solution Properties

(a) All synthetic latices have excellent stability to mechanical disturbances, natural latex may be rated good in this respect, and reclaim dispersions variable depending on the method of manufacture. It is difficult to directly compare the three types of systems as they respond to different degrees to various types of mechanical disturbances. No uniform method of measuring stability has been yet adopted. For natural latex a high speed stirring method *(14)* has found most favor, for GR-S latices a shearing method has been proposed *(11)*, while for dispersions excellent results have been claimed for a modified stirring test *(6)*.

(b) GR-S latices have excellent dilution stability which further work may correlate to their relatively small particle size. Reclaim dispersions, on the other hand, due to their high gravity, are relatively poor in dilution stability and tend to settle out.

(c) Care must be exercised in adding vulcanizing agents to GR-S latices as they are unstable chemically. Reclaim dispersions, however, are generally very stable and no special handling precautions are necessary. Hevea latex is intermediate in this respect.

(d) Surface tension data have been obtained from various authors *(4,8)*. A value for the reclaim dispersion was furnished by the manufacturer.

(e) Recent work on particle size of the various latices with the electron microscope *(1)* and motion picture studies *(10)* has revealed that Buna S latex consists of particles of smaller average size and greater uniformity than natural latex. The particle size of Buna S latex is generally considered as being 10 to 20 times smaller than natural latex and in the range of the particle size of reinforcing colloidal carbons *(1)*.

There is no dispute that the particle size of synthetic latices is smaller than natural latex but there is no general agreement on natural latex itself. A microscopic examination *(7)* has shown a somewhat different distribution in regard to particle size. It has been postulated *(4)* that reclaim dispersions are broken down to the original latex particle size during the process of manufacture.

Differences in particle size of GR-S latex as compared to natural latex may explain at least in part: better dilution stability, higher viscosity, and greater increase in viscosity upon the addition of thickeners. One would expect greater penetration of textiles and greater difficulty in concentrating by centrifuging for GR-S latex because of its smaller particle size.

(f) No putrification occurs with synthetic latices as they contain no protein material. Natural latices contain protein and are susceptible to spoiling, as are also reclaim dispersions that contain casein.

Table III—Thickening Effect of Casein

Latex	% Increase in Viscosity
GR-S, Type 2	335
GR-S, Type 3	318
Natural Latex	14.8
Reclaim dispersion *	14.7

* This minor effect on viscosity of the reclaim dispersion may or may not be a general characteristic of reclaim dispersions. This particular grade is quite viscous when received since it is prepared on a casein base.

Table IV—Chemical Stability

Latex	Change Upon Addition of 5% NaCl	% Coagulum After 24 Hours
GR-S, Type 2	flocculation	60% (completely NG)
GR-S, Type 3	coagulation	22%
Natural latex	no change	Some flocs
Reclaim dispersion	no change	0

Uncured Film Properties

Table V illustrates some of the film properties before vulcanization. The strength of natural latex films is far superior to the others. Of interest may be the thermoplastic nature of GR-S as revealed by the low Williams recovery values.

Table V—Characteristics of Uncured Latex Films

Property	GR-S Type 2	GR-S Type 3	Natural Latex	Reclaim Dispersion
Tensile Strength, p.s.i.	too weak to measure	200	775	150
Elongation, %		1500	900	550
Tack	very poor	fair	excellent	variable
Mooney Plasticity	35	79	over 120	over 120
Wms. Plasticity	115	153	228	228
Recovery	19	15	180	215
Color	Reddish Brown	Cream	Tan	Black
Stickiness to Metal	high	very high	low	high

TABLE VI—NATURE OF COAGULUM

Latex	Coagulum
Type 2	Porous, weak, sticky lumps
Type 3	Compact, moderately strong, sticky lumps
Natural Latex ...	Compact, strong, non-sticky mass
Reclaim Dispersion	Granular, non-sticky, sludge

The tack, ultimate strength, and stretch determine how well the individual cords will adhere to each other and to skim stocks before separation occurs in the form of "splits". A film that is plastic is desirable in that it allows better flow during calendering and hence gives better surface contact to both cord and skim stock.

In processing operations a certain amount of coagulum will be produced by settling, coagulation around stirrers, drying, and general poor stability. Table VI describes the nature of coagulum produced from each of the materials examined. Knowledge concerning the nature of the coagulum may be important in certain instances such as determining the ease of cleaning equipment. Good film strength will allow cleaning by stripping rather than scraping.

Cured Film Properties

In Tables VII and VIII are shown the properties of the vulcanized films. The characteristics of the cured films determine the over-all quality level. Of particular interest may be the relationships expressed in Figures II and III. These figures describe the heat generation and time to blowout. The values presented vary from those usually shown for solid polymers as the latices are not reenforced by carbon black nor softened by plasticizers.

As is to be expected, rubber latex shows superior stress-strain characteristics and a much lower hysteresis loss than the GR-S latices and reclaim dispersion. Since there is such a minor proportion of latex solids in the carcass of a tire, it is debatable as to the ultimate importance of this property. It may be argued, on the one hand, that since heat generation is a problem in synthetic tires, it is desirable to maintain this property at the lowest level possible in all parts of the tire, irrespective of the source. On the other hand, it may be contended that heat generation in itself is of minor consequence, the important characteristic being the loss in physical properties of the film at the elevated temperatures produced by heat generation. Both viewpoints are here reported with the hope that they may stimulate some reader to present evidence as to the real nature of the problem involved.

The final test of a dipping treatment is the cured bond strength obtained in a tire carcass. In Fig. IV are shown three charts illustrating adhesion results obtained under varying conditions. The first two charts show the unaged and aged adhesions obtained, using natural latex as a standard (100%). The third chart shows the drop in adhesion of each latex upon heat aging. GR-S, Type 3, shows up as well as natural latex on original adhesion. After aging 48 hours at 212°F. in a hot air circulating oven, however, GR-S, Type 3, shows itself to be very much superior. This characteristic may have been suspected from the reversion tendencies of natural rubber and the stiffening tendencies of GR-S under heat conditions.

TABLE VII—FORMULATIONS USED IN OBTAINING CURED FILM PROPERTIES (DRY BASIS)

Ingredients	GR-S Type 2	GR-S Type 3	Natural Latex	Reclaim Dispersion
GR-S, Type 2.....	100	.....	.....	.....
GR-S, Type 3.....	.....	100	.....	.....
Natural Latex	.....	.....	100	.....
Reclaim Dispersion	.....	.....	.....	200
Potassium Caseinate	3	3	2.75	0.75
XX4 ZnO	3.5	3.5	2.5	4.8
Sulfur	3	3	2.5	4
BJF	1.2	1.2	.....	1.6
Ureka C	.....	.....	0.4	.....
Guantal C	.....	.....	0.25	.....
Neozone D	1.5	1.5	1.0	2.0
Darvan #1	0.25	0.25	0.15	0.32
NaOH	.....	.....	0.1	.....

TABLE VIII—CURED FILM PROPERTIES

Property				
Time of cure—min./300° F.....	45	45	20	40
Tensile Strength, p.s.i.....	350	1250	3500	850
Elongation, %	325	360	850	290
Durometer—Shore A	47	50	40	58
Goodrich Flexometer				
Temp. Rise—°F. (above 100° F.)	73	64	12	54
Blowout time—min.	4.5	9.5	over 1 hr.	5
Comp. Set, %	15.3	17.7	1.4	10.8
Oven-Aging 24 hrs./212° F.				
Tensile Strength, p.s.i.....	500	900	3900	700
Elongation, %	290	330	750	170

The properties of the individual latices have been shown above. The use of blends has found much favor in practice in order to effect a compromise among

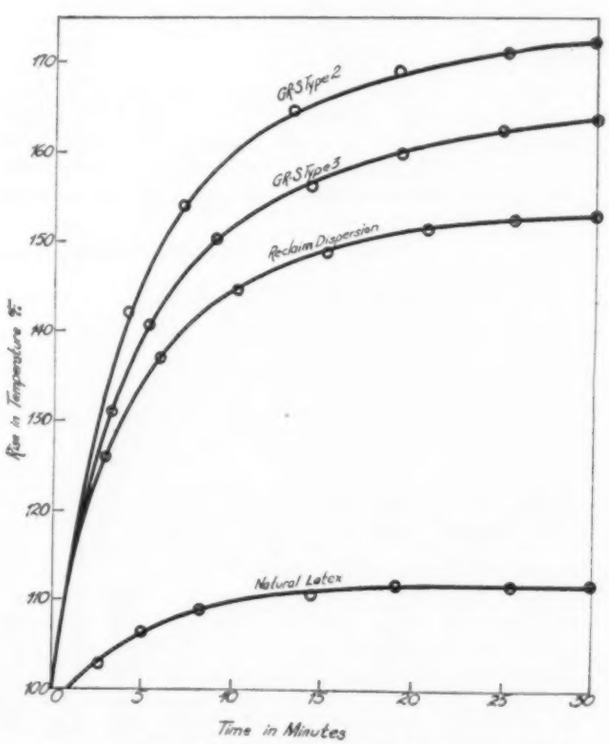

FIG. 2—Goodrich Flexometer Data on Heat Generation.

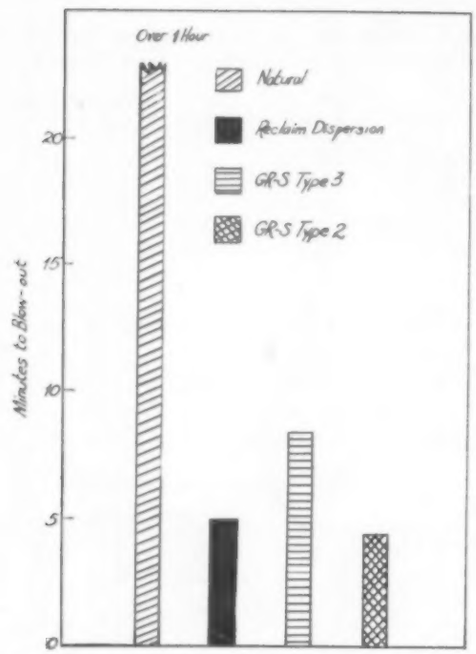

FIG. 3—Goodrich Flexometer Data on Blowout Time.

some of the poorer properties of these various latices and to obtain some of the benefits of their better properties. It would be expected that blends would show intermediate properties, fairly well reflecting their percentage composition. In general, natural rubber latex is the highest quality material examined according to these laboratory tests. However, excellent tires have been built using these other dipping treatments.

Discussion

As mentioned in the introduction, this paper is concerned mainly with screening tests to determine the suitability of latices for cord dipping. An important omission will be noted at once: no data is presented on flexing tests designed to simulate carcass failures. The reason is that these authors have yet found no test method which may be considered entirely suitable.

One proposed test *(5)* which is still used as a basis for patent claims on improved cord treatments *(18)* is quite time consuming (as the number of flexures to failure with modern treatments may mount up into the millions) and fails to differentiate any further once the treatments reach the "high grade" level.

A good test method will be useful in studying a number of allied problems. First, there is a dearth of data on the nature of adhesion, or stated more simply: what makes things stick? This is a fruitful field for investigation. Second, other lines of investigation will be assisted. Aside from good ply bond strength at elevated temperatures and under conditions of flexing, research may reveal what is the role of specific physical properties of the latex film on good tire performance. A prerequisite to answering this question will be to distinguish basic physical characteristics from those which are derived.

Finally, the subject of cord impregnation and its relation to adhesion, cord embrittlement, and flex fatigue is still subject to much controversy *(2, 3, 9, 16, 17, 19)*. It has been stated, at least on theoretical grounds, that synthetic latices should give deeper penetration of textile materials than natural latex or reclaim dispersions because of their smaller particle size *(15)*. It is felt that no satisfactory evidence on this point, or of impregnation in general, has yet been presented.

In response to the question: Is a cord treatment necessary for the production of good tires?, one would receive as many different answers as the number of the development engineers questioned. The proponents have claimed that cord dipping gives improved calendering with reduced chance of cord crushing, lack of skim coat peeling during fabrication, increased ply adhesion and longer service life due to tire construction from an entirely weftless fabric and to saturation of the cord with "live" rubber. Additional confirming evidence on these points is indicated.

The reason for these many gaps and inaccuracies, as well as disagreements, appears to be seated in our lack of understanding of the function of a cord treat-

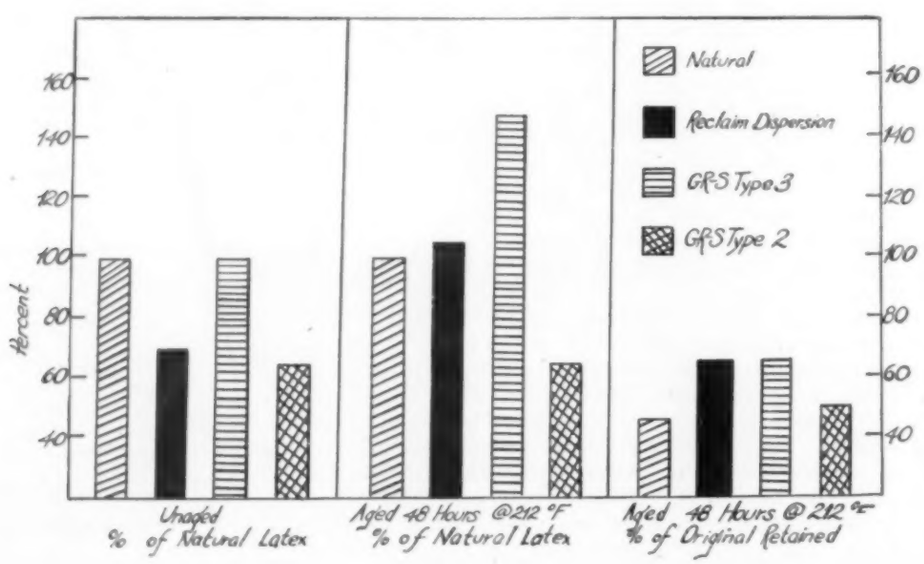

FIG. 4—Static Adhesion Data.

ment. The authors firmly believe that as long as tires fail by ply separation or carcass breaks, there should be a much more sustained effort than has heretofore been exhibited to untangle the underlying phenomena

Test Methods

Chemical: Analyses of the composition of the reclaim dispersion were run according to ASTM designation D-297-43T.

Dilution Stability: Practical mixtures were prepared, carefully diluted to 5% solids, allowed to stand 24 hours and the smoothness noted.

Chemical Stability: To 50 gm. of a 25% solution of latex 15 ml. of 5% NaCl solution was added dropwise, the latex meanwhile being mechanically stirred. The amount of coagulum filtered off after standing 24 hours was used as a measure of stability.

Relative Viscosity: Measurements were made on a Stormer Viscosimeter at 25°C. Relative viscosity is expressed as the ratio of time (seconds) for 100 revolutions in latex as compared to time in water for an equal number of revolutions.

Effect of Casein: Ammonia caseinate to the extent of two parts per hundred of latex solids was added to a 25% solution of latex. The relative viscosity, expressed as a percentage of the original relative viscosity, is used as a measure of thickening power.

Mooney Plasticity: Rubber Reserve GR-S testing specification, Revised 1/1/44, was used after drying out films.

Williams Plasticity: Tested on pellets built up from dry film. Plasticity is expressed as the thickness of the pellet in thousands of an inch after a twenty minute warmup and ten minute compression at 70°C.

Nature of Coagulum: The samples were diluted to 10% solids and 50 gm. of 0.1N H_2SO_4 was added dropwise as the sample was stirred. The coagulum was then examined.

Hysteresis: The latices were compounded, cast into films on glass plates, dried, Goodrich flexometer pellets built up and molded in a press. The test conditions were:

Characteristic	*Heat Generation*	*Blowout Time*
Load	100#	150#
Stroke	0.2"	0.28"
Speed	1800	1800
Temperature	100° F.	100° F.

Adhesion: Values were obtained by a strip test method using a 1" wide specimen and tested in a Scott machine with a jaw separation speed of 1" per minute. Test pads were assembled using a balloon type cotton fabric impregnated with latex. Typical GR-S and rubber carcass stocks were used in a sandwich construction cured in a press. The values used represent the average obtained from the various stocks.

ACKNOWLEDGMENT

The authors wish to express appreciation to Miss Margaret Seaman for assistance in preparing the graphs.

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Foxboro CycleLog Controller

For batch-type processes and other operations where rate of temperature increase or decrease must be controlled, as well as the actual processing temperature and duration, the Foxboro Company, Foxboro, Mass., has developed the CycleLog Controller. The name CycleLog was adopted as expressing the instrument's unique function, in controlling and recording all the steps of a complete process cycle. No time-cams or supplementary instruments are employed. CycleLog control is completely automatic, according to whatever schedule is predetermined by adjustments of four setting knobs on the instrument panel. In batch dyeing, for example, the CycleLog Controller will bring the bath temperature up from any starting point, regardless of daily or seasonal variations, to the desired holding point, and do this at any desired rate of rise from 1° to 8°F. per minute. It will then hold the bath at exactly the correct temperature.

Triple Cut Specimen Shear

A new triple cut specimen shear, designed for use with the Taber V-5 Stiffness Gauge, to assure accurate cutting of test specimens for uniform and comparable test results, has been announced by the Taber Instrument Corp., North Tonawanda, N. Y. Recommended especially for shearing very thin specimen materials which if not cut to precision may affect the test results, the new shear will cut .020-inch paper, plastic or thin metallic sheet and foil in preparation of stiffness or resilience test on the stiffness gauge. A test strip is cut and detached from a sheet in one operation by simply placing the straight edge of the sample sheet against the back gauge of the shear and pushing down with a quick motion. The company has also announced the availability of extra auxiliary weights for the V-5 Stiffness Gauge in 3,000 to 5,000 units. These extra units extend the testing range of the instrument to cover twice the capacity of the standard units.

High Polymer Division, A. P. S., Holds Meeting in New York City

APPROXIMATELY 300 members and guests attended the meeting of the High Polymer Division of the American Physical Society held at Columbia University in New York City on January 24, 25 and 26, in conjunction with the regular meeting of the parent society. Twenty-six technical papers were presented, many of them causing considerable discussion.

S. L. Gerhard, of the U. S. Rubber Co., and H. A. Robinson, of the Armstrong Cork Co., were elected members of the Executive Committee of the Division, the other members of the committee being W. F. Busse (General Aniline), R. B. Barnes (American Cyanamid), L. A. Wood (Bureau of Standards), W. J. Lyons (Firestone), and J. H. Dillon (Firestone). The following officers were elected for the coming year: *Chairman*, H. A. Robinson (Armstrong Cork); *Vice-Chairman*, S. L. Gerhard; *Secretary*, W. J. Lyons; *Treasurer*, L. H. Wood.

Tentative plans were laid for a symposium and general meeting to be held during the coming year. Suggestions for the symposium will be welcomed by the officers of the Division. Abstracts of the twenty-six papers delivered at the January meeting follow herewith:

Abstracts of Papers

Thermal Diffusion of Polymers, *P. Debye (Cornell University, Ithaca, N. Y.)*

Experiments on thermal diffusion of high molecular weight polymers in solution were performed using the Clusius-Dickel arrangement. It was found that whereas molecules of small molecular weight have a thermal diffusion coefficient of the order of 1% of the ordinary diffusion coefficient, both coefficients are of the same order of magnitude for polymers. It was also found in the special case of polystyrene that the thermal diffusion coefficient increases with increasing molecular weight indicating that thermal diffusion methods can be used for fractionation purposes as well as for the observation of the molecular weight distribution curve. The question whether thermal diffusion of molecules with the same molecular weight depends also on their form (f.i., branched or straight chain) has not yet been answered. The instruments which we have used are cylindrical in form, hot and cold cylinder concentric with a narrow interspace. Other experiments have shown that packing of the interspace may have practical advantages. The thermal diffusion method also seems appropriate for the purification of liquids from small amounts of impurities. The work has been done in collaboration with A. Bueche and was supported by the Rubber Reserve Company.

X-Ray Diffraction by Potassium Laurate Solutions: A Contribution to the Mechanism of Emulsion Polymerization, *E. W. Hughes (Shell Development Co.).*

This paper will describe the results of an x-ray diffraction study, mostly at small scattering angles, of aqueous potassium laurate solutions with and without other added substances. The soap concentration has been varied over the range 10% to 50%, which includes the phase change from isotropic solution to anisotropic "middle soap." The added materials include KCl up to 2.0 weight normal and more than thirty hydrocarbons and hydrocarbon derivatives. The hydrocarbons have been added in some instances up to a concentration of one mole per mole of soap. These experiments are part of a study of the role of soap in emulsion polymerization.

The Use of Color and Fluorescence Indicators for Studying the Constitution of Glasses, *W. A. Weyl (Glass Science, Inc., State College, Pa.)*

The fact that light absorption and emission depend on the environment of the ions and molecules which absorb or emit light can be used to draw conclusions about the structure of liquids, glasses and crystals. This method supplements, to a certain extent, information gained from other sources, such as X-ray diffraction data. The method is illustrated by several examples, like the influence of thermal history on the structure of glass and the constitution of the yellow fluorescing zinc orthosilicate.

The Mechanical Properties of Fibers, *Henry Eyring and George Halsey (Textile Research Institute Laboratories, Princeton, N. J.).*

The stress-strain behavior of textiles has been interpreted quantitatively in terms of a model with a viscous element in parallel with one spring and in series with a second. Such a viscous element is of the non-Newtonian type required in plastic flow. The treatment of more complicated conditions of straining gives rise to equations best treated by the superposing of elementary processes. For any restraint, methods are given for computing the stress-strain curves from the elementary processes.

Stress-Relaxation of Compressed Cork, *S. L. Dart and Eugene Guth (University of Notre Dame, South Bend, Ind.).*

The stress-relaxation of corky materials is of theoretical significance for the understanding of such two phase (corky material plus air) systems, and is of great practical interest, since these materials are commonly used as gaskets, seals, etc. Stress-relaxation was studied at various degrees of compression and at temperatures ranging from 30° C. to 200° C. The experimental data were obtained from an automatic stress-relaxation machine which employed the principle of a chainomatic balance. It was found that the stress-time curves for various compressions could be obtained from each other by multiplication. This experimental fact is generalized by the statement that the stress is a product of two functions. The first factor is essentially identical with the S-shaped load-compression curve of cork and is independent of time. The second factor is shown to be a linear function of log t and is independent of compression.

The linear stress-log time curve is found to persist over a wide range of times and to continue until the stress has decayed to zero at the higher temperatures. The decay time as obtained either by actual experiment or by extrapolation is shown as a function of temperature. This gives a fairly complete picture of the stress-time-temperature behavior of cork under compression.

The Formation of Ionized Water Films on Dielectrics Under Conditions of High Humidity, *Robert W. Field (General Radio Co.).*

When a dielectric is placed in an atmosphere of 100% relative humidity, an ionized film of water forms, whose conductivity at the end of one minute is within a factor of ten of its equilibrium value, which is usually attained within an hour. This equilibrium conductivity ranges from essentially zero for certain hydrocarbon waxes, silicone resins and silicone-treated glass to 100 mho for ordinary glass and quartz. The ionized water film also produces interfacial polarization at its interface with the dielectric, which produced a marked increase in both capacitance and dissipation factor at audio frequencies. This polarization builds up in the same manner as the conductivity. Its relaxation frequency appears to be in the audio range.

The Molecular Structure of Some Polyuronides as Revealed by X-Ray Diffraction Studies, *K. J. Palmer (Western Regional Research Laboratory, Albany, Calif.).*

Recent X-ray diffraction studies carried out on some naturally occurring polymers, particularly polymannuronic acid (alginic acid) and polygalacturonic acid (pectic acid), show that they are essentially long straight chains. The symmetry of the chain in alginic acid is two-fold; in sodium alginate three-fold. The polygalacturonide chain remains three-fold in pectin, pectinic acid and pectic acid as well as the Na, K, and Rb pectates. The fiber axis identity period of the polygalacturonide chain is always about 13 Å. This identity period is compatible with the generally accepted chemical structure for this chain when the pyranose rings are assumed to have one of the two alternative transconfigurations. Moisture isotherms and X-ray data on pectinic acids show that absorbed water hydrates the polar groups and increases the interchain separation. The non-uronide material which occurs to the extent of 10-20% in the pectates has no detectable influence on the X-ray pattern.

Statistics of Cross-Linked Polymers, *Walter H. Stockmayer (Massachusetts Institute of Technology, Cambridge, Mass.)*

The present statistical theory of molecular distribution is highly branched and cross-linked polymer will be critically reviewed. The existing theory rests on two assumptions. The first, that all similar functional groups are equally reactive, becomes invalid for dilute solutions or for diffusion-controlled reactions. The second, that no cyclic structures can form, is more serious and must be removed before truly cross-linked polymers can be treated, but the mathematical difficulties are formidable.

Experimental observations of gel points will be compared with the theory. For polycondensations, agreement is tolerably good, so that the statistical formulae may be applied with some confidence to these reactions prior to the gel point. Such an application has already been made to a study of the viscosities of branched polyesters. The theory has now been extended to deal with a general polycondensation reaction involving any number of components. For addition polymers, the theory is generally poor, because its basic assumptions are seriously violated.

Finally, the necessity of an improved theory for the gelled state will be emphasized. Flory's treatment, though qualitatively attractive, appears not to be generally applicable. It is concluded that cyclic structures must be specifically considered in the basic formulation of the theory.

Thermal Polymerization of Drying Oils, *H. E. Adams and P. O. Powers (Armstrong Cork Co., Lancaster, Pa.).*

Studies of the heat polymerization of drying oils have been made by conducting the polymerization in dilute solution. After the reaction has been carried out, the solvent is removed and the properties of the oils compared with oils similarly treated without solvent. It has been found that iodine values of the oils are substantially the same regardless of the concentration of oil, and depend only on the time and temperature of heating, but that the viscosity decreases with lower concentration of the oils. This behavior substantiates the formation of an intrapolymer. By using the values at various concentrations it may be possible to estimate the extent of intrapolymer formation in heat bodied oils.

Some Thermodynamic Properties of Slightly Cross-Linked Gels, *R. F. Boyer and R. S. Spencer (Dow Chemical Co., Midland, Mich.)*

It has been shown recently (Boyer, *J. Chem. Phys.*, Vol. 13, p. 363-1945) that a measurement of the deswelling of slightly cross-linked gels by high polymer solutions affords in principle a new method of determining the number-average molecular weights of polymers. In order to assess the merits of this method, it has been necessary to explore the behavior of gels in some detail. Amount of cross-linking agent, size of the sample, percentage of soluble material present in the gel, variation of swelling ratio in pure solvent for a series of supposedly identical gels, and influence of solvent type were among the factors studied.

Measurements of the equilibrium swelling volumes of a series of identical gels in a wide range of solvents afford a convenient method for evaluating solvent power or solvent-polymer interaction. This is done in terms of the parameter μ_g which arises in the theory of gels. Some fifty solvents have been examined in this regard. Determination of μ_g for solvent-nonsolvent mixtures leads to some interesting results. All work reported here is confined to styrene-divinyl benzene gels.

The Determination of Polymer-Liquid Interaction by Swelling Measurements, *Paul Doty and Helen S. Zable (Brooklyn Polytechnic Institute, Brooklyn, N. Y.)*

The interaction of polymers and liquids can be fairly well characterized by the value of the quantity μ, commonly used in thermodynamics of polymer solutions and evaluated from osmotic pressure measurements. The Flory-Rehner theory of swelling relates the amount of swelling of a slightly cross-linked polymer in a liquid to μ and a parameter M_c, the average molecular weight between cross-links. M_c may be determined for a cross-linked polymer from its swelling volume in a solvent in which osmotic pressure measurements with the uncross-linked polymer have given the value of μ. The cross-linked polymer, thus calibrated, can be used to obtain the μ value for other liquids by measuring its swelling volume in them.

This procedure has been carried out on polyvinyl chloride which can be cross-linked by heating. Calibration in three different liquids gave comparable values of M_c, thus checking the Flory-Rehner theory. The quantity μ was determined at two different temperatures for fifty liquids. The value of μ and the temperature dependence of μ correlate well with the observed properties of the binary systems. The variations of μ with molecular weight in an homologous series is demonstrated.

Electrostatic and Tensile Properties of Rubber and GR-S at Elevated Temperatures, *R. S. Havenhill, H. C. O'Brien and J. J. Rankin (St. Joseph Lead Co., Josephtown, Pa.)*

This paper describes a new apparatus for measuring electrostatic contact potentials on various materials at elevated temperatures. In this apparatus the electrostatic charge, acquired by rolling a steel ball down the surface of a rubber test specimen on a heated inclined plane, is measured when the ball drops into the cup of a suitable measuring device such as our electrostatic modulator. With this instrument the contact potential of both rubber and GR-S was found to become highly negative at elevated temperatures. This apparent "boiling off" of electrons and resultant disruption of electrostatic attractive forces within the material is much greater for GR-S than for rubber and probably accounts for the much greater decrease in tensile of GR-S over rubber at elevated temperatures, and is further confirmation of the

electrostatic contact potential theory of reenforcement. By the further application of this theory suitably dispersed compounding materials, which are in effect highly positive at elevated temperatures, such as certain proteins, finely divided silica and sodium silicate, have been found to substantially increase the hot tensile strengths of GR-S compounds.

Significance of the Stress-Temperature Relationships for Rubber, *Paul E. Wack, R. L. Anthony and Eugene Guth (University of Notre Dame, South Bend, Ind.).*

In the relaxation method of obtaining stress-temperature relationships, samples are relaxed at various constant relative lengths at a fixed temperature T^x for a fixed time t^x. Then the temperature T is lowered and the corresponding change in the stress Z (force per unit original cross section) measured. Until recently the dependence of the stress upon the variables T^x and t^x has been obscure. It was found that the stress as a function of the four variables, L, T, T^x, t^x, can be resolved into two factors F and G, the first depending on L and T only and the second upon T^x and t^x only. This result shows that only the absolute value of Z depends upon the temperature T^x and duration t^x of the relaxation while the form of the dependence of Z upon L and T *(i.e.,* the S-shape of the stress-strain curve) is independent of T^x and t^x. Thus the physical significance of the stress-temperature relationship is clarified. The above factorization implies certain similarities in the families of curves obtained when some of the four variables are kept constant, *i.e.,* when cross-plottings are made. For the simple case of pure stress relaxation $T^x = T$, and the above factorization implies simply the similarity of Z-L curves at constant T and various t^x, and of the Z-t curves at constant T and various L. The factor F is given by the kinetic theory of rubber elasticity, while the factor G may be interpreted as a function of the number of primary and secondary cross-bonds (varying with temperature and time) in the rubber network.

The Theory of Permanent Set at Elevated Temperatures in Natural and Synthetic Rubber Vulcanizates, *R. D. Andrews and A. V. Tobolsky (Princeton University, Princeton, N. J.), and E. E. Hanson (Firestone Tire & Rubber Co., Akron, Ohio).*

A molecular theory is developed to describe quantitatively the permanent set taking place in thin samples of vulcanized natural and synthetic rubbers held at constant extension at elevated temperatures. Permanent set is considered to be the result of the formation, through the action of molecular scission and cross-linking reactions, of a dual molecular network in the rubber sample, in which the network chains are of two types: chains which are at equilibrium when the sample is at its unstretched length, and chains which are at equilibrium when the sample is at its stretched length. According to the theory the amount of permanent set in a rubber sample is a function of only two quantities: the relative ratio of the number of chains of the two types, and the elongation at which the sample was held. Experimental data on permanent set for various rubber types and under different conditions are presented and are shown to be in good agreement with the theory.

The Crystallization of Unvulcanized Rubber at Different Temperatures, *Lawrence A. Wood and Norman Bekkedahl (National Bureau of Standards, Washington, D. C.)*

The crystallization and melting of unvulcanized natural rubber in the unstretched state have been investigated at different temperatures. Change of volume has been used as a quantitative measure of the extent of crystallization, and mercury-filled dilatometers containing the rubber have been used for the volume measurements. Crystallization was observed to occur at temperatures between —50° and +15° C. and to be most rapid at about —25° C. The final decrease of volume on crystallization was usually found to lie between 2.0 and 2.7 per cent.

The melting of the crystalline rubber was found to occur over a range of temperature and to be strongly dependent on the temperature at which the crystals were formed. The temperature at which the beginning of melting occurs is from 4° to 7° above the temperature of crystallization. The range of melting is about 35° at the lowest temperatures and decreases to about 10° at the highest. The same range of temperature of melting is obtained regardless of the extent of the crystallization.

Tackiness of GR-S and Other Elastomers, *W. F. Busse, J. M. Lambert and R. B. Verdery (General Aniline & Film Corp., Easton, Penna.).*

The deficiency of GR-S in "tackiness" resulted in a great deal of work in the rubber industry to improve this complex property, but practically all the work had to be evaluated by qualitative "hand tests" because quantitative tests were not available. An analysis of the factors involved in the "tackiness" of various materials showed that different factors were critical in the so-called "tackiness" of rubber, paints and varnishes, printing inks, adhesive tapes, etc. A quantitative test was developed to measure the effects of rate of removal on the adhesion or "tackiness" of pressure-sensitive adhesive tapes over a 10^6 fold range of rates. This showed why the results of standard "adhesion tests" of tapes do not predict the relative behavior of the tapes under small forces acting for long times.

Another test was developed for the measurement of the "tackiness" of GR-S which correlates well with the judgment of tackiness by hand tests and it even works reasonably well with rough samples taken from a laboratory mill. With this test, the effects of mastication conditions, aging, and of the addition of softeners and tackifiers on "tackiness" of GR-S (with and without carbon black) were studied. The German tackifier "Koresin" which is now manufactured in this country was found to be far more effective than rosin and similar materials formerly used and gave a tackiness approaching that of natural rubber.

Stress-Time-Temperature Relations in Polysulfide Rubbers, *M. D. Stern and A. V. Tobolsky (Princeton University, Princeton, N. J.).*

Polysulfide rubbers of various internal structures have been investigated by measurements of continuous and intermittent relaxation of stress and by creep under constant load at temperatures between 35° C. and 120° C. Continuous stress relaxation measurements indicate that these rubbers approximately obey the simple Maxwellian law of relaxation of stress, which indicates that one definite type of bond in the network structure is responsible for stress decay. The activation energy for the relaxation process in each of the polysulfide rubbers is nearly the same, indicating that the same type of bond is responsible for the relaxation behavior of all the polysulfides investigated. In contrast to the hydrocarbon rubbers, oxygen is not the cause of high temperature relaxation in polysulfide rubbers, nor does heating in air at moderate temperatures for times comparable to the relaxation time produce permanent chemical changes or changes in modulus. Several possibilities regarding the mechanism of the relaxation process and the type of bond involved are considered in the light of the experimental results.

Application of Infra-red Methods in the Structural Examination of Synthetic Rubber, *J. E. Field, D. E. Woodford and S. D. Gehman (Goodyear Tire & Rubber Co., Akron, Ohio).*

The physical properties of a synthetic polymer are associated with variations in molecular structure which are dependent on the conditions of the polymerizing reaction and the monomers used. In some cases, structural differences of significance for physical properties cannot be detected by infra-red methods because the relative number of chemical linkages affected is too small. An important structural detail which can be followed by infra-red analysis is the relative amount of 1,2 and 1,4 polymerization occurring in polymerization reactions of butadiene.

Absorption curves are reproduced to show the wide range

in the relative amounts of these two structures. A description is given of an attempt to obtain a quantitative measure of this ratio by means of a calibration curve derived from known mixtures of pure octene 1 and octene 2. For polyisoprene, variations in the proportions of 1,4 and 1,2 or 3,4 structure also occur depending upon the type of polymerization. Comparison with Hevea and balata fails to disclose definite evidence of trans isomerism in synthetic polyisoprene.

Structural differences due to oxidation of polymers may be readily apparent in infra-red spectra, hydroxyl and carbonyl groups being especially prominent. The effectiveness of antioxidant in preventing structural changes due to oxidation is shown in a series of absorption curves for samples of GR-S with and without antioxidant. When the samples were heat treated in air, pronounced structural changes occurred for the sample without antioxidant, but no perceptible changes were evident for the sample with antioxidant. On the other hand, the antioxidant used (phenyl-beta-naphthylamine) was ineffective for stabilizing the structure toward ultra-violet light.

Viscometric Investigation of Dimethyl Siloxane Polymers, *Arthur J. Barry (Dow Corning Corp., Midland, Mich.).*

A series of dimethyl polysiloxane fluids including pure distilled known members of linear and cyclic structures up to ten siloxane units in size as well as a series of intermediate oils of linear structure, whose number average molecular weights have been independently determined, have been studied viscometrically. The intrinsic viscosities were determined and the Staudinger constant evaluated. The molecular weights of several high viscosity polysiloxane fluids were estimated on the basis of this constant and a good fit with the Flory melt viscosity relationship found.

Some Fundamental Relationships between Intrinsic Viscosity, Diffusion and Sedimentation Constants and Thermodynamic Properties of High Polymer Solutions, *Robert Simha (National Bureau of Standards, Washington, D. C.).*

Empirical relations previously proposed for the variations of the sedimentation and diffusion constants of high polymers are reviewed. If:

$$s = \frac{s_o}{1 + k_s c}, \quad D = D_o \ (1 + k_{De}),$$

then for dilute solutions:

$$k_s + k_D = \frac{2bM}{RT} + v_{sp}$$

where b is the slope of the reduced osmotic pressure curve, M the molecular weight of the polymer, and v_{sp} its specific volume.

Since in several instances k_D is small, while in some cases k_s is fairly well represented by the intrinsic viscosity, one may expect in general a certain parallelism between the latter quantity and the thermodynamic term. Analysis of a number of solutions of natural and synthetic polymers over a wide range of molecular weights and of varying slopes b, shows the ratio between the thermodynamic factor and the intrinsic viscosity to assume values between one and two for most systems. Barring very poor solvents, a semi-empirical equation is proposed which relates the intrinsic viscosity to equilibrium properties of the polymer-solvent system, viz.:

$$(1 - 2\mu) \frac{V_2}{V_1} = r \ [\eta] \ V$$

is the well known parameter in the expression for the activities, V_2 the volume ratio between the two components. $[\eta]V$ represents the intrinsic viscosity, based on volume fractions, and r is a factor which assumes values between one and two in the majority of cases considered.

Thin Section Methods for the Electron Microscopic Examination of Cured Polymers, *H. C. O'Brien (St. Joseph Lead Co., Josephtown, Pa.).*

A method is described involving the use of the "Cyclone Knife" Ultramicrotome for the preparation of thin sections (0.1 to 1.0 micron) of cured rubber and other high polymer compounds. Such materials which do not permit the formation of film samples for the electron microscope due to their insolubility may thus be examined in thin sections for pigment dispersion and other characteristics. The Ultramicrotome, accessory apparatus, and the preparation and mounting of the specimens for the electron instrument are described. Micrographs of compounded polymers are presented to define the value of the method.

Attachment for Obtaining Angular Distribution of Scattered Light from Measurements with a Ninety-Degree Turbidimeter, *J. N. Wilson (Shell Development Co.).*

A device is described which in conjunction with a ninety-degree turbidimeter permits measurement of the angular distribution of the intensity of scattered light over the range 145 to 115 degrees and 65 to 35 degrees. The apparatus consists of two mirrors by means of which the direction of the incident light beam can be varied over the required range. A discussion is given of methods of calibration and of typical results obtained.

A Photoelectric Light Scattering Instrument and a Differential Refractometer for Measuring Molecular Weights, *P. P. Debye (General Aniline & Film Corp., Easton, Penna.).*

The method of determining particle sizes and molecular weights by light scattering measurements on solutions (Debye, *J. Applied Physics,* Vol. 15, p. 338, 1944) is finding increasing fields of application. In order to obtain the necessary data quickly and conveniently an instrument has been developed which allows the required light scattering measurements to be taken on a routine basis. This apparatus is described. It measures transmission and the scattering of light at 90°; two different schemes can be employed to obtain the angular intensity distribution of the scattered light.

A description is also given of a compensating refractometer which is used to determine the difference in refractive index of solvent and solution. The instrument, which is simple in design, gives a direct reading of the refractive index difference and has an accuracy of better than 10^{-6}.

The light scattering instrument has been tested using polystyrene of known molecular weight, and has been applied to study the change of apparent molecular weight (or particle size) of a series of polyvinyl ethers as a function of concentration in some cases, also a number of solvents. For a series of polyvinyl n-butyl ether samples which was studied, the relation between the intrinsic viscosity $[\eta]$ of the benzene solutions and the weight average molecular weight M determined by light scattering is $\eta = .365 \times 10^{-7} M^{1.45}$.

Thermal Expansion and Second-Order Transition Effects in High Polymers. III Time Effects, *R. S. Spencer and R. F. Boyer (Dow Chemical Co., Midland, Mich.).*

It has been suggested (Alfrey, Goldfinger and Mark, *J. App. Phys.,* Vol. 14, p. 700, 1943) that the so-called second-order transition in high polymers is not an equilibrium phenomenon, *i.e.*, a true thermodynamic singularity, but rather a rate effect. Confirmation of this point of view has been obtained by determining the equilibrium volume-temperature curve for polystyrene, *i.e.*, the volume-temperature curve corresponding essentially to an infinitely slow rate of temperature variation. Such equilibrium curves exhibit no transition within the temperature range of from 20° C. to 140° C., whereas the same material shows a second-order transition at about 82° C. for rates of heating usual in thermal expansion measurements.

Two facts appear in agreement with the viscous flow theory of thermal expansion (Boyer and Spencer, *J. App. Phys.,* Vol. 16, p. 594, 1945): First, two mechanisms were found to operate in thermal expansion at markedly different rates. One

mechanism gave almost instantaneous expansion even at room temperature, whereas the other was extremely slow at room temperature, becoming more rapid as the temperature was raised. Second, the activation energy for the slower mechanism was found to be of the order of magnitude of that for viscous flow, considerably lower than the activation energy for high (or retarded) elasticity. Volume-temperature curves at finite rates of heating are discussed in light of these findings.

A New Approach to the Theory of Relaxing Polymeric Media, *M. S. Green and A. V. Tobolsky (Princeton University, Princeton, N. J.).*

A molecular theory of relaxing media is presented which gives an expression for the stress in terms of the strain history. At any given time the strain history produces a distribution in internal strains which for mechanical properties can be characterized by a limited number of internal strain parameters. The second law of thermodynamics is used to define dissipation of energy at constant temperature and explicit expressions for dissipation of energy for any strain history are obtained. Inasmuch as relaxation during straining causes an essential reorganization of structure which is in fact the cause of dissipation, the kinetic theory of elasticity is extended to non-isotropic polymeric networks. A tensor expression for the stress-strain-time relations is thereby developed.

Application of Molecular Distribution Methods to the Statiscal Mechanics of High Polymer Solutions, *Bruno H. Zimm (Brooklyn Polytechnic Institute, Brooklyn, N. Y.).*

In the expression for the osmotic pressure of a solution as a power series in the concentration, the term in the second power of the concentration determines the deviations of dilute solutions from ideality. A general expression for the coefficient, A_2 of this term has been developed for high polymer solutions using the probability distribution function of the configurations of a pair of chain molecules.

In favorable cases it is found that the well known Flory-Huggins equation arises as a first approximation, but that in general serious modifications to this equation must be made. These modifications arise from more complicated interactions of chain segments than are considered in the Flory-Huggins treatment and can be shown both theoretically and experimentally to be very considerable.

It can be further shown that A_2 must depend on the molecular size, according to a relation whose first two terms are

$$A_2 = A_2^{\circ} (1 - k\, p^{1/2}\, A_2^{\circ}/R^3)$$

where A_2° and k are constants, p is the degree of polymerization, and R is the root-mean-square distance between chain ends.

Report on Some Recent Accidents

THE following accident happened to an operator who had had four years of laboratory experience, with more than half of that time on operating mills and other laboratory equipment. This operator, while setting out a batch of gum, reached down to the switch with his right hand to start the mill. At the same time he reached under the mill rolls with his left hand to pick up the stock as it came through to keep it from sticking to the back roll. By error his right hand struck the reverse button instead of the forward motion. His left hand was drawn at once into the bite of the rolls. He immediately jerked his hand free and in so doing pulled off the fleshy tips of three fingers.

Fortunately the bones and tendons were not damaged and through proper surgery and treatment he will be able to use his fingers. The switch panel is being moved up in plain sight of the operator and the reverse button is being taken off the panel and set in its old location near the speed control. Laboratory mills are small but still hold the hazard of serious injury.

Pushing Stock Into Mill Bite

An operator was pushing stock into the mill bite with his left hand while reaching under the rolls to pick up stock. His left hand was pulled into the rolls. He pulled the safety stop and other mill room employees loosened the rolls and released the hand. As a result of the accident the operator sustained the loss of parts of his thumb, index, second and third fingers.

All mill operators must be instructed that stock must not be pushed into the mill bite by hand and that the operator must not work past the top center of the roll toward the bite on either the front or back roll while the mill is operating.

Another Mill Bite Accident

An operator had made it a practice to use a coarse bristle brush, reaching across the mill bite and sprinkling the back roll with water to keep the stock from sticking when starting the batch. On this occasion the brush was caught in the bite and the operator's hand drawn in.

It appeared to the operators nearby that the injured employee was trying to pull the safety stop but did not catch it. A nearby operator stopped the mill. As a result of this accident, the operator lost his left hand. It was discovered later that the operator had had several other brushes go through the mill but this fact had not been called to the attention of the foreman. This use of brushes has been discontinued and a pipe sprinkler has been installed.

The investigation also disclosed that this man was disturbed and had talked to his supervisor about personal matters before going to work. Being upset is a factor in many an accident.

One further point contributed to the injury: a device for mechanically forcing the stock into the mill had been installed. As a result the working space above the bite was reduced. The handles to this device were a few inches below the safety trip bar. It is thought that when the operator reached for the bar he grabbed this handle instead. No bar or installation should be permitted to interfere with standard safety equipment.

Use of Rubber Gloves

A mill operator who was wearing gloves could not get them off. His left hand stuck to the rubber and he reached over with his right hand to attempt to get himself free. The right hand also stuck to the rubber. With both hands stuck he was pulled up on the roll. He attempted to hit the safety rope with his feet but missed. An operator on an adjoining mill pulled the safety cord. The mill was stopped with the operator on top of the roll just ready to go into the bite.

Safety News Letter

Editorials . . . . . .

Rubber Agreement

THE conclusion of negotiations between the United States and the three principal rubber producing nations — England, Holland and France — on the price of natural rubber for the transitional period, resulting in a price of 20¼ cents per pound delivered free on board ocean-going vessels at the shipping point, which means approximately 21¾ cents per pound laid down in New York, was quite satisfactory to American rubber manufacturers. Most manufacturers were of the opinion that the price would be considerably higher, since the rubber producers were in the saddle, so to speak, from the viewpoint that the United States needs natural rubber.

The argument has been advanced that the influencing factor in keeping the price of natural rubber down was the fact that synthetic rubber is being sold in the United States for 18½ cents a pound while plant manufacturing costs "have declined markedly in the recent past and are more than covered by the present selling price." There can be no question that the synthetic rubber production facilities in the United States will act as an effective brake on natural rubber prices, but from the long range rather than the short range view.

According to the most recent available information, the United States began the current year with an inventory of 125,000 long tons of natural rubber. Present reconversion planning is based on the receipt of some 300,000 tons of natural rubber from all sources during the year. Washington officials are in agreement that in the event the receipts on which current planning is based do not materialize, the rate of conversion might have to be slowed down. Or, in other words, despite the fact that the United States could easily produce 1,000,000 tons of synthetic rubber in 1946, against an estimated over-all consumption estimate of 900,000 tons for the country, unless we secure some 300,000 tons of natural rubber reconversion activities will falter.

What it sums up to is this: Despite the tremendous technological strides made in the manufacture and use of synthetic rubber, the universal synthetic rubber has not yet been produced. For many products a good portion of natural rubber, and for some products 100% of natural rubber, is still required. Manufacturers of such products are anxious to launch volume production of civilian goods. Unless substantial quantities of natural rubber are forthcoming, such production will be limited. From this angle, therefore, the rubber producers can play the tune.

From the long range viewpoint, however, there can be little doubt of three factors: (1) The war-created synthetic rubber industry in the United States is here to stay, probably through continued government operation; (2) Production cost of synthetic rubber will continue to be reduced, to the benefit of the consumer; (3) Properties and characteristics of synthetic rubber will continue to be improved to the point where need for natural rubber as a component part will be considerably reduced or eliminated.

It is true that the agreements covering the price of 20¼ cents per pound for natural rubber expire within the next few months—March 31 in the case of the British and June 30 in the case of the Dutch and French. It is also very likely that a higher price will be sought by the rubber-producing interests, especially the British, when those agreements expire. It is even quite possible that the higher production and cultivating costs of both native and plantation estates may warrant higher prices, but eventually the prevailing prices of synthetic rubber will bring the price of the natural product into alignment. The present price, however, is quite satisfactory, as previously stated, and full credit for it is due the American members of the International Rubber Study Group, especially Donald D. Kennedy, of the State Department, and Alan L. Grant, president of the Rubber Development Corporation.

Labor Meeting

HISTORY in labor-management relations in the rubber industry is currently being made. Representatives of the so-called "Big Four"—Goodyear, Goodrich, U. S. Rubber and Firestone—are meeting with the officers of the United Rubber Workers of America (CIO) in an attempt to work out contracts covering all of the factories operated by those manufacturers. These companies account for approximately 115,000 workers, or 65% of the workers in the field, and operate some 50-odd plants. Although it is emphasized that any decisions reached as a result of the joint meetings would affect the four specific companies only, it is reasonable to assume that the pattern set would affect the entire industry. It is too early to determine whether any concrete and beneficial results to the industry will come from the joint meetings, but the fact that the meetings themselves have been arranged is a credit to both management and labor in the field.

CURRENT NEWS OF THE MONTH

AGREEMENT MADE WITH RUBBER PRODUCERS ON PRICE DURING TRANSITIONAL PERIOD

THE State Department announced on January 28 that price negotiations have been concluded under which the Rubber Development Corporation (RFC subsidiary) will purchase all natural rubber allocated to the United States by the Combined Raw Materials Board or its successor, the Combined Rubber Committee, from British, Dutch and French areas in the Far East at a price of 20¼c per pound for standard type grades. The price covers rubber delivered free on board ocean-going steamers at Far Eastern ports. The agreement is intended for the transitional period only and covers the period of September 2, 1945 (V-J Day), through June 30, 1946, in the case of the Dutch and French, and the period September 2, 1945, through March 31, 1946, in the case of the British. Substantial quantities of rubber have already been shipped from British areas. Since freight and insurance costs amount to approximately 1½c a pound, the price of rubber laid down in New York under the agreement will be approximately 21¾c per pound.

It will be recalled that the report issued by the International Rubber Study Group after the meeting held in London last November indicated that United States capacity for production of synthetic rubber is now about 1,055,000 tons a year and that total world capacity was estimated between 1,300,000 and 1,400,000 tons. It also indicated that manufacturing costs for synthetic rubber in the United States have declined markedly in recent months "and are more than covered by the present ceiling price of 18½c per pound for general purpose synthetic rubber." The latter factor is believed to have dictated the interim price set for natural rubber.

Higher Price Expected

Although several American rubber manufacturers had urged an interim price of around 18½c per pound for natural rubber, with an eventual reduction to 12c a pound, the announced price of 20¼c per pound came somewhat as a surprise since plantation interests were known to be promulgating a price of around 30c a pound.

In fact, according to one report from London, Malayan rubber growers are complaining that they have been victimized under the terms of the agreement, since the price paid them by the British Government for their rubber (approximately 16.9c a pound) is ruinous due to increased production costs.

A group of these growers has made a collective protest to the Colonial Office in London stating that it is impossible for them to pay a living wage to labor and to rehabilitate their estates on the basis of the present price paid to them. The figure of $100,000,000 has been mentioned as necessary to repair and restore plantations.

On the basis of the figures presented, the Malayan growers are urging the British Government to secure a revised agreement with the United States under which the agreed upon price of 20¼c per pound would be raised to 28 or 30c per pound delivered in the United States.

American rubber interests, particularly tire manufacturers, were in general agreement that the price of 20¼c per pound delivered Far East was fair and equitable and most manufacturers were relieved that it was no higher. These manufacturers pointed out that if a higher price had been agreed upon the government would probably be forced to raise the ceiling price of 22½c which now applies to natural rubber and if this ceiling were lifted many manufacturers would be obliged to request OPA to allow them to secure higher prices on their products.

Particular credit was paid to Donald D. Kennedy, chief of the International Resources Division of the State Department, and Alan L. Grant, president of the Rubber Development Corp., for securing the 20¼c price which, incidentally, covers standard type grades of smoked sheet.

One of the immediate effects of the interim price agreement will be to release approximately 40,000 tons of natural rubber which has been accumulated in recent months in the United States. Not all of this rubber will go to American rubber manufacturers but a good percentage of it will.

According to figures supplied by the Netherlands Rubber Institute, some 3,366 long tons of natural rubber have been exported from the Netherlands Indies since the Japanese surrender. The first shipment of natural rubber from French Indo-China since the war arrived in the United States on February 14. It consisted of some 8,000 tons. A second shipment from that area is expected by the end of the current month.

Form Combined Rubber Committee

Formation of a Combined Rubber Committee comprising representatives of the six major rubber producing and consuming countries to continue international allocation control for rubber supplies during the world shortage was announced by George Tisdale, chairman and American member of the Group, on January 29. The Committee will carry on allocation control previously maintained through the Combined Raw Materials Board and its Rubber Committee but will function autonomously.

Member countries and their official representatives are as follows: *Belgium,* Mr. C. Duchateau, Belgian Economic Mission; *Canada,* Mr. G. C. Bateman, Department of Reconstruction and Supply; *France,* Mr. Jean Lageat, French Supply Council; *Netherlands,* Mr. E. C. Zimmerman, Commissioner for the Netherlands Indies; *United Kingdom,* Mr. Douglas Campbell, British Raw Materials Mission; *United States,* Mr. George M. Tisdale, Bureau of International Supply, Civilian Production Administration.

Revise Rubber Order

In keeping with the policy of allowing the use of natural rubber in some products and increased amounts of such rubber in other products, the Civilian Production Administration revised Rubber Order R-1 and Appendixes I and II to

Division Banquet

It has been announced that there will be an advance sale of tickets for the banquet to be held by the Division of Rubber Chemistry, A.C.S., on Thursday, April 11, at Atlantic City, N. J. The sale will be restricted to members and associate members of the Division until March 15. After that date, tickets will go on general sale to members of the A.C.S. and guests who may wish to attend. Tickets will be $5.00 each, and may be secured in advance by sending orders to William B. Dunlap, Jr., c/o Lee Rubber & Tire Corporation, Conshohocken, Penna.

that order on February 1. Under the revision the total consumption of natural rubber will be increased by approximately 2,000 tons monthly.

The revised order permits the use of natural rubber in toys and other straight civilian items generally considered nonessential, including rubber bands. Toys specifically covered by the revision include molded dolls, blown dolls, sculptured bounce toys, sponge play balls, and toy bath sponges.

Increased amounts of natural rubber are now permitted for logger and earthmover tires while the permitted amount of natural rubber content in passenger car tires is increased to 2 ounces. No increase is provided for highway truck and bus tires. The increase permitted for passenger tires will speed their production by making possible faster installation of bead wire. Increases are also provided for footwear, tire cord and conveyor belting.

Advisory Committee Meets

Because of the difficulty of restoring production of natural rubber in liberated Far Eastern areas, it will be two years or more before American industry can return to unlimited use of the natural product, members of the Civilian Production Administration's Rubber Advisory Committee were told by W. James Sears, Director of the CPA Rubber Division at a meeting on February 1.

Mr. Sears declared that if receipts of natural rubber during the next six months bear out present estimates, it will be possible to more than double the current ration of natural to general-purpose synthetic rubber. He pointed out that this still would leave industry far short of requirements for unlimited use. The percentage rise would be from the present 10 to about 25 per cent at the end of six months.

The nation began the year with an inventory of 125,000 tons of natural rubber. Present reconversion planning is based on receipt this year of some 300,000 tons from all sources, as now estimated. If the receipts on which the planning is based do not materialize, the rate of conversion might have to be slowed, it was pointed out.

The committee discussed the tentative schedule for reconversion to wider use of natural rubber and recommended that a "conservative" national working inventory be maintained during the period while natural rubber still is in short supply. Until more information is available on the amount of natural rubber that may be forthcoming as a result of new production in the Far East, the committee recommended that an adequate inventory position be maintained which the Rubber Division believes should be about an eight months' supply.

L. B. Proctor, vice-president of the Rubber Development Corporation, gave this picture of the natural rubber situation in the Far East, based on the best information available to government agents in those countries:

Indo-China—There was believed to have been 170,000 tons but at least 15,000 tons were sabotaged. Therefore, the Rubber Development Corporation is counting on no more than 150,000 tons in the next six months if labor and shipping can be secured. New production for 1946 probably will not exceed 25,000 to 35,000 tons, which is half of prewar production.

Malaya—Much of the rubber has come down from the up-country and 50,000 to 60,000 tons of stock were recovered in reoccupation, of which a good proportion has been shipped to consuming areas. The labor force is dissipated and it is doubtful if more than 30 per cent of the prewar force can be rounded up. New production for the first quarter of 1946 is put as low as 15,000 tons, with 24,000 tons additional likely to be produced in the second quarter.

Netherlands East Indies—Reports indicate between 80,000 and 90,000 tons. There is no information on possibilities of new production.

Urge Continued Control

At an off-the-record meeting held in Washington with Mr. Sears and W. L. Batt, chairman of the Inter-Agency Committee on Rubber Policy, on January 31, a group of leading rubber manufacturers urged that the government continue its control over the synthetic rubber industry both in the interests of national security and to block possible skyrocketing of natural rubber prices by foreign interests. These manufacturers urged that at least 250,000 tons of synthetic rubber be turned out annually and that facilities to produce another 350,000 tons be retained in stand-by condition. Continued government control is essential, they pointed out, if all of the synthetic produced is to be consumed.

There is little doubt in rubber trade circles that most, if not all, of the industry's views will be incorporated in the recommendations which are due to be submitted to the White House within the next few weeks by Mr. Batt in his capacity as chairman of the Inter-Agency Policy Committee. Although rubber executives are not too keen on having the government involved in their industry, they are resigned to the fact that neither the industry nor the government can afford to abandon the $750,000,000 synthetic rubber facilities.

Extension of the Second War Powers Act which expires on June 30 is expected to be urged on Congress. It is under this measure that the government has the right to operate the synthetic rubber plants, establish the price of such rubber, and purchase natural rubber. Should extension be denied, the CPA will probably ask for special legislation setting up a rubber regulatory body that would govern all phases of the rubber question.

Recent Government Regulations

Several changes in government regulations of direct interest to the rubber manufacturing field have been made in recent weeks, including the following:

The brand name of a listed group of tires has been changed, several brand names have been added, prices for new sizes of original equipment assemblies not specifically priced in the regulation were set, and the pricing of factory seconds was simplified in Amendment No. 11 to M.P.R. 435 (New Bicycle Tires and Tubes), issued by OPA on January 30.

Retail and wholesale dollar-and-cent ceilings have been established on approximately 90 new items of waterproof rubber footwear which have been out of production since 1941 in Amendment No. 4 to M.P.R. 229 (Retail and Wholesale Prices for Rubber Footwear). The ceilings are in line with ceilings established for synthetic rubber footwear produced during the war, these prices being slightly higher than the 1941 prices of footwear made of natural rubber.

Supply jobbers of coated and combined fabrics have been provided with new methods of determining their ceiling prices in Amendment No. 11 to M.P.R. 478 (Coated and Combined Fabrics), issued by OPA on January 25. The amendment also makes several other changes of a minor nature in the regulation, including coverage of the regulation, allowance of cash discounts, reporting by supply jobbers, and the method of computing prices on coated fabrics made from government surplus finished goods.

All quota limitations on the consumption of rosin were lifted by the Civilian Production Administration in an amendment to Order M-387 on February 6. The amendment places rosin under the general restrictions of Priority Regulation 32 for the time being.

Price control has been suspended on all toys and games except "wheel goods"—metal wagons longer than 18 inches, velocipedes, tricycles, miniature automobiles, etc. Controls will remain on the wheel goods until the danger of sharp price increases, and of the diversion of still-scarce metal and rubber, is past.

Emery Named ACS Secretary

Alden Hayes Emery, assistant manager of the American Chemical Society since 1936 and its assistant secretary since 1943, has been elected secretary and business manager of the society, succeeding Charles L. Parsons, who retired on December 31 after serving for 38 years. Mr. Emery is a former official of the U. S. Bureau of Mines. He was born in Lancaster, N. H., on June 2, 1901, attended high school in Wellington, Ohio, and received the bachelor of arts degree magna cum laude in 1922 from Oberlin College, where he specialized in chemistry. Since joining the ACS staff, Mr. Emery has been responsible for the arrangements for all national meetings of the society and has organized and directed the local section speaking tour service.

COTTON AND RAYON TIRE CORD COMPARED IN SPECIAL REPORT

Official tests made by the government to determine the comparative merits of standard cotton, "Wilds" variety cotton, and rayon tire cords are described in detail in a special 100-page report prepared by the Office of Rubber Reserve, Reconstruction Finance Corporation, which has been released to the Office of the Publication Board, Department of Commerce, for distribution.

Of the tires tested, those with rayon cords were relatively superior to those with cotton cords in respect to mileage, but the cotton tires showed a slightly better tread wear rating than rayon tires, according to the report.

Three tests were conducted under the direction of the Office of the Rubber Director, War Production Board, and the Rubber Reserve Company for the following purposes:

(1) To compare standard cotton cord and "Wilds" variety cotton cord in carcasses of 6.00-16 standard (4-ply) S-3 (synthetic rubber) passenger tires.

(2) To compare standard cotton cord, "Wilds" variety cotton cord, and rayon cord in carcasses of 7.00-20 (10-ply) highway tires on the rear wheels of White Model WA- 118 trucks.

(3) To compare standard cotton cord, "Wilds" variety cotton cord, and rayon cord in carcasses of 7.00-20 (10-ply) highway tires on the front wheels of White Model WA-118 trucks.

Two companies, the Armstrong Tire and Rubber Company, Natchez, Mississippi, and the Seiberling Rubber Company, Akron, Ohio, participated in the tests conducted by the Government Tire Test Fleet. The U. S. Department of Agriculture collaborated in organization of the tests. The tests were begun in August, 1944, and concluded in January, 1945.

The results of the tests, as summarized in the report, follow:

(1) Standard cotton cord is entirely adequate for 6.00-16 (4-ply) passenger car tire service. If "Wilds" cotton has any superiority in quality over standard cotton, this difference cannot be demonstrated in passenger car tires under Government tire test fleet operating conditions, because no failures have resulted from cord weaknesses at mileages up to 68,000 miles.

(2) In 7.00-20 (10-ply) S-4 (synthetic rubber) tires in front wheel service, "Wilds" cotton tires showed a 30 per cent superiority for final mileage over standard cotton tires, but rayon showed a 70 per cent superiority for mileages over standard cotton.

(3) In 7.00-20 (10-ply) S-4 tires in rear wheel service, "Wilds" cotton tires showed a 202 per cent superiority for mileage over standard cotton tires. The rayon cord tires tested showed a 517 per cent improvement over the standard cotton tires for mileage.

(4) Cotton tires show a slightly better tread wear rating than rayon tires.

The report, known as No. 2921 in the OPB series of scientific and industrial reports, contains detailed data on the procedures followed in performing the tests, as well as a large number of tabulations. It also contains copies of letters written by members of various government agencies including the War Production Board and the Department of Agriculture, involved in the tests. Copies of the report may be secured by writing the Office of Publication Board, Room 1326, Commerce Building, Washington 25, D. C., at a cost of $7.00 for photostat copies or $1.00 for microfilms.

Coming Events

Feb. 25 - Mar. 1. A.S.T.M., Spring Meeting, Pittsburgh, Penna.

Feb. 25 - Mar. 2. 20th Exposition of Chemical Industries, Grand Central Palace, New York City.

Mar. 5. Los Angeles Rubber Group, Mayfair Hotel, Los Angeles, Cal.

Mar. 8. Boston Rubber Group, Copley Plaza Hotel, Boston, Mass.

Mar. 8. Philadelphia Rubber Group, Kugler's Restaurant, Philadelphia, Penna.

Mar. 8. Quebec Rubber & Plastics Group, Ritz-Carlton Hotel, Montreal, Canada.

Mar. 15. Detroit Rubber & Plastics Group, Detroit-Leland Hotel, Detroit, Mich.

Mar. 22. Chicago Rubber Group, Hotel Morrison, Chicago, Ill.

Apr. 10-12. Rubber Division, A.C.S., Atlantic City, N. J.

June 24-28. A.S.T.M., 49th Annual Meeting, Buffalo, N. Y.

Sept. 8-15. American Chemical Society, Chicago, Ill.

Labor-Management Conference

Final arrangements are being made at this writing (February 8) for the first joint labor-management conference to be held between the so-called "Big Four" rubber companies—U. S. Rubber, Goodyear, Goodrich and Firestone—and the United Rubber Workers of America. The purpose of the meeting, which sets a precedent in labor-management relations in the rubber industry, will be to attempt to work out an industry-wide pattern on wages and hours.

Detroit Meets March 15

The next meeting of the Detroit Rubber & Plastics Group will be held on Friday evening, March 15, in the Jade Room of the Detroit-Leland Hotel in Detroit, Mich. No speaker has been announced at this writing, but an interesting program is promised.

FISHER URGES MORE RESEARCH IN FIELD OF VULCANIZATION

Chemists may be able to develop better products through research in the field of vulcanization, Dr. Harry L. Fisher, director of organic research for U. S. Industrial Chemicals, Inc., Stamford, Conn., told the Cornell Section of the American Chemical Society at a meeting held in Ithaca, N. Y., on February 7.

Although chemists know enough about rubber to synthesize it in many ways, they still do not fully understand vulcanization—the process of chemical treatment which made rubber so important to industry in the first place by increasing the natural material's strength and adding other desirable qualities—Dr. Fisher explained. The physical effects of vulcanization are fairly well known, he said, but the chemistry of the process remains a challenge to the scientist, presenting an inviting opportunity for interesting and fruitful study.

Vulcanized rubber and vulcanized rubber-like substances always show a loss in plasticity, this being probably the most important change of all, according to Dr. Fisher. Other changes he cited, were higher tensile strength, greater elasticity, higher recovery, wider temperature range of elasticity and much less solubility and stickiness.

In vulcanization with sulfur, "it is known that the sulfur combines chemically with the rubber or the rubber-like substances, but it is not yet known in what form the sulfur combines," he pointed out. It is assumed that the rather abrupt changes taking place during vulcanization are produced by intermolecular cross-linkings or bridges which may consist of sulfur, but this is entirely theoretical, since there is no direct chemical evidence on the subject.

Chemical evidence is provided by analogy, however, he declared, giving as an example the fact that sulfur monochloride vulcanizes rubber rapidly, even at room temperature, and that its action "can be explained by the formation of a sulfur bridge as in the reaction of this reagent or ethylene to give mustard gas."

"Since the theoretical explanation of vulcanization is incomplete," Dr. Fisher said, "work in this important field can still be very interesting and fruitful."

Glen Joins CPA Rubber Division

Earl W. Glen, of the Goodyear Tire & Rubber Co., who recently inspected the German rubber industry and advised in the rehabilitation of French rubber factories, has been appointed assistant director of the Rubber Division of the Civilian Production Administration. He succeeds George L. Allison, of the B. F. Goodrich Co. The appointment of Mr. Glen is in keeping with a policy of the rubber companies of loaning top technical men to the government. Mr. Glen spent 16 years working for Goodyear in Akron on the development and design of rubber products.

GOVERNMENT AGENCIES OFFER SURPLUS RUBBER PRODUCTS

Various government agencies charged with the disposal of war-time surplus materials are currently offering these wares for public purchase. In some cases the goods are offered on a bid basis and in others they are offered at specific prices. The following paragraphs cover some recent surplus offerings.

The Philadelphia regional office of the War Assets Corp. recently placed on sale several million feet of electric wire and cable originally made for the British Admiralty. Included in the offering were 22 basic types and 239 individual patterns of wire and cable suitable to a wide variety of peacetime applications. All of the wire and cable is covered or insulated with rubber, synthetic resin, or other insulating material. The wire is stored at the Naval Depot at Mechanicsburg, Penna., and arrangements for its inspection can be made through the regional office at Philadelphia.

Thousands of airplane fuel and oil cells, suitable for conversion into fishing boats, feed troughs, sand-boxes, etc., have been made available in any quantity to the general public by the Third Service Command, Army Service Forces, 1315 Walnut St., Philadelphia 7, Penna. At retail, these cells cost $1.00 each for those up to 125 gallon capacity, $1.50 for those of 200 gallons, and $3.50 for those larger than 200 gallons. Composed of synthetic three-ply rubber, the cells vary in size, shape and capacity. Sales are held at various installations, and information can be secured direct from the Third Service Command.

Approximately 8,000,000 rolls of friction tape and 2,000,000 rolls of rubber splicing tape were recently offered to dealers by the Office of Surplus Property of the Reconstruction Finance Corporation. The friction tape comes in half-pound rolls of 82½ feet and the splicing tape in 15 foot rolls, both types being ¾ inch wide. Smallest order accepted is for 2,000 rolls. Further information on these surplus items can be secured from any of the regional consumer goods offices maintained by the Reconstruction Finance Corp.

Changes at Mishawaka Rubber

The Mishawaka Rubber & Woolen Manufacturing Co., Mishawaka, Indiana, has enlarged its sales staff and has made several promotions in the organization to cope with expanded business in the footwear field. G. D. Babcock, a vice-president and director of the firm, who has been manager of sales since 1937, is now director of sales; J. L. Duncan, former assistant manager of sales, is manager of sales; G. C. Wehmer, formerly a district sales manager, is assistant manager of sales; and L. S. Long, formerly sales supervisor and manager of sales research, is sales personnel manager.

TWO PROMOTIONS ANNOUNCED IN GOODRICH SALES ORGANIZATION

Allyn I. Brandt **John R. Hoover**

B. F. Goodrich Chemical Co., Cleveland, Ohio, recently announced two promotions in its sales organization. John R. Hoover, formerly general sales manager of plastic materials, has been appointed vice-president in charge of sales, while Allyn I. Brandt, formerly general sales manager of rubber chemicals, has become general sales manager of all products. Mr. Hoover, who has been in the rubber and plastics industries for more than 20 years, joined the parent Goodrich company at Akron as a laboratory chemist soon after being graduated from Harvard University in 1925 with a B.S. degree in chemistry. He served as manager of the general chemical laboratories, assistant sales manager and later manager of tank linings, and general sales manager of plastics materials. Mr. Brandt, a graduate of the Case School of Applied Science, joined the Goodrich organization at Akron in 1930 as technical assistant to the vice-president in charge of the Industrial Products Division. Assigned to reclaimed rubber sales a year later, he was made vice-president in charge of sales of the Philadelphia Rubber Works Co., Goodrich subsidiary, in 1940.

Dinner Tendered to Douglas

Walter R. Douglas, special assistant to the general sales manager of the General Products Division of the U. S. Rubber Co., and dean of rubber drug sundries salesmen, was the guest of 30 drug sundries manufacturers at a testimonial dinner held at the Advertising Club in New York City on February 7. Mr. Douglas, who has spent more than 40 years in the field, over 38 of them with the U. S. Rubber, will retire on April 1. The dinner was arranged by E. I. Kilcup (Davol Rubber), J. Thomas Gibbons (Seamless Rubber), and Clyde O. DeLong (Goodrich).

Form Roberts Toledo Co.

The Roberts Toledo Rubber Co. has been organized in Toledo, Ohio, to continue the manufacturing operations of the Bowling Green Rubber Co. at 1200 Prospect Ave. and M. C. R. R. The new company is headed by Robert Roberts as president. The Bowling Green Rubber Co. has not been discontinued as an organization and will probably continue to operate from some other location.

Schedules 34th Safety Congress

The 34th National Safety Congress and Exposition, which was postponed last year because of travel difficulties, has been scheduled for the week of October 7, 1946, at the Stevens Hotel in Chicago, Ill. Under the sponsorship of the National Safety Council, meetings will be held at the Stevens, Palmer House, Congress and possibly other hotels in the Chicago area, but the exposition will be held at the Stevens. Further information regarding the Congress will be made available in the near future.

Opens New York Offices

To enable the company to serve its customers more efficiently in the eastern territory, the B. F. Goodrich Chemical Co. has established offices in the French Building, 551 Fifth Ave., New York 17, N. Y. O. E. Isenburg and R. F. Dettelbach will handle sales of Geon polyvinyl materials, while Jack H. Rines and Roger Bascom will be sales representatives of Philadelphia reclaimed rubber and Hycar synthetic rubber, respectively.

CHICAGO RUBBER GROUP HEARS PRIZE-WINNING CONTEST PAPERS

Approximately 150 members and guests attended the meeting of the Chicago Rubber Group held at the Hotel Morrison in Chicago, Ill., on January 25, which featured the announcement of the winners in the prize contest sponsored by the group under the title of "On the Utilization of Cured Synthetic Rubber Scrap" and presentation of condensed versions of the three prize-winning papers.

First prize, consisting of a $500.00 cash award by the group and a $1,000.00 War Bond donated by A. Schulman, Inc., went to H. P. Burchfield, of the Naugatuck Chemical Division of the U. S. Rubber Co., Naugatuck, Conn., for his paper on "New Color Tests for the Identification of Natural and Synthetic Rubber Vulcanizates;" Second prize, $300.00, to Kathleen Rostler and Richard M. White, of the University of Delaware, Newark, Delaware, for their paper on "A Study of Reclaiming Oils with Regard to Swelling Action on GR-S and Natural Rubber;" and third prize, $200.00, to H. Harmon Gillman, of the Gates Rubber Co., Denver, Colorado, for his paper on "Some Aspects of Reclaiming GR-S."

Method of Coding Papers

In accordance with the rules of the contest, all of the 30-odd papers submitted were sent in triplicate to A. R. Floreen, vice-president of the Chicago City National Bank and Trust Co., who coded them before submitting a copy to each of the three judges, the judges being Dr. J. W. Temple (U. S. Rubber), G. K. Trimble (Midwest Rubber Reclaiming), and W. W. Vogt (Goodyear). The contest committee was headed by H. A. Winkelmann (Dryden Rubber), and included K. E. La Point (Sears-Roebuck), E. T. Meyer (Herron & Meyer), and Bruce W. Hubbard (Ideal Roller). Although all three prize-winners were asked to attend the meeting, none of them knew which prize they had won until the announcement was made at the meeting itself.

Method of Coding Papers

The meeting was opened by Francis Frost (Frost Rubber), vice-chairman of the group, substituting for the chairman, James P. Sheridan (N. J. Zinc), who was unable to attend due to a foot infection. Mr. Frost introduced William N. Crumpler (Mepham Corp.), secretary-treasurer of the group, who read an address of welcome prepared by Mr. Sheridan. In the address, Mr. Sheridan stressed the point that the meeting served as an indication that the Chicago Rubber Group is not only interested in receiving popular technical data from outside sources, but realized its position in the world of rubber technology by making available to industry technical data created by the sponsorship of special prize-winning contests. He also expressed appreciation to Dr. Winkelmann and the members of his committee for making the contest a success.

Following the presentation of Mr. Sheridan's address, Dr. Winkelmann took over the meeting in his capacity as chairman of the Contest Committee. He first introduced the representatives of various concerns which had furnished financial support to the contest, including those representing Sears, Roebuck & Co., Philadelphia Rubber Works Co., Tanney-Costello, Inc., A. Schrader's Son, Monsanto Chemical Co., Naugatuck Chemical, Herron & Meyer, Xylos Rubber Co., A. Schulman, Inc., Witco Chemical Co., H. Muehlstein & Co., Pequanoc Rubber Co. He then introduced J. H. Nesbit, president of the U. S. Rubber Reclaiming Co., who acted as spokesman for the Rubber Reclaimers Association, Inc. Mr. Nesbit complimented the group for sponsoring the contest and on the manner in which it was handled. Condensed versions of the three prize-winning papers, restricted to 20 minutes each, were then presented.

Abstract of Burchfield Paper

In his paper on "New Color Tests for the Identification of Natural and Synthetic Rubber Vulcanizates," which took top honors in the contest, Mr. Burchfield pointed out that compounded and cured rubber articles based on the polymer types represented by natural rubber, GR-S, and Perbunan can readily be distinguished from one another by reacting the products formed on thermal decomposition with p-dimethylaminobenzaldehyde in alcoholic hydrochloric acid solution. Condensation reactions take place which result in the formation of intensely colored products. Natural rubber produces a violet-blue solution, GR-S a green, and Perbunan a crimson. Neoprene and Butyl give definite but considerably less intense color reactions. Vulcanizates based on these polymers are further distinguished by measurement of the pH and specific gravity of the pyrolysis products.

When time is an important consideration, the tests can be shortened by the use of spot methods. A filter paper strip impregnated with p-dimethylaminobenzaldehyde is wet with a solution of trichloroacetic acid in isopropanol and held in the smoke evolved when the sample is branded with a metal rod heated to redness. Natural rubber produces a blue coloration on the paper and GR-S a green. Butyl is detected in a similar manner with filter paper strips wet with a solution of mercuric sulfate in sulfuric acid. A stable yellow color is produced owing to the presence of isobutylene in the decomposition products. The presence of neoprene is established by use of an acid-base indicator, and the presence of Perbunan by the copper-acetate benzidene test.

The spectrophotometric properties of the p-dimethylaminobenzaldehyde reaction products and applications to the detection of mixtures were also discussed in detail.

Study of Reclaiming Oils

The second prize-winning paper, "A Study of Reclaiming Oils with Regard to Swelling Action on GR-S and Natural Rubber," was presented by Mrs. Rostler. This work gave what is believed to be the first orientation on the behavior of reclaiming oils as to swelling action on the two materials covered. The oils available for reclaiming purposes were classified into five groups, based on their chemical character, and measurements on the chemical character of the oils and their swelling effect were presented, together wtih a correlation of the physical and chemical characteristics of the oils themselves.

One of the conclusions drawn from the work, as emphasized by Mrs. Rostler, is that a variety of oils are available having such distinctly different effects on cured GR-S and natural rubber that it is possible to select oils or combinations of oils giving any desired swelling, the swelling being either temporary or permanent, depending on the boiling range of the oils.

It was also concluded that oils can be selected according to their preference in swelling GR-S to achieve larger, smaller or equal swelling of individual components of mixed scrap.

Gillman on Reclaiming GR-S

In presenting the paper on "Some Aspects of Reclaiming GR-S," the third prize-winner, Mr. Gillman first emphasized the fact that the reclaiming industry was faced with a number of serious problems in satisfactorily reclaiming GR-S by present methods. He then reviewed present knowledge concerning the known differences between rubber and GR-S, briefly traced the present understanding of vulcanization and of reclaiming mechanisms for rubber, and finally demonstrated which of the characteristics of GR-S interfere in attempting to reclaim that material by present methods and which will need to be overcome before a successful solution to the problem is found.

Mr. Gillman also discussed a series of tests which prove that GR-S does not respond to reclaiming agencies in the same manner as rubber. These tests indicated that whereas rubber softens when subjected to heat and oxygen, GR-S hardens under the same conditions. The results of tests with compounds containing various amounts of chemical peptizers were also discussed.

In concluding his talk, the author stressed the point that though not by any means complete, the solution of the problem of reclaiming GR-S is far enough advanced to be classed as "not critical." In his opinion, the greater problem is one of the reclaiming of mixtures. He predicted that tires of the future will incorporate blends of synthetic and natural rubber because compounders will find advantages in such blends. Since the different synthetics and natural rubber all respond to varying degrees to reclaiming treatment, modern techniques

will not suffice to handle mixtures successfully, and new developments are needed.

Publication of Papers

The paper on "A Study of Reclaiming Oils With Regard to Swelling Action on GR-S and Natural Rubber," by Kathleen Rostler and Richard M. White, which won second prize in the contest, is published in full elsewhere in this issue of RUBBER AGE. The third prize-winner, "Some Aspects of Reclaiming GR-S," by H. Harmon Gillman, will appear in the March issue of RUBBER AGE.

Although the first prize-winning paper, "New Color Tests for the Identification of Natural and Synthetic Rubber Vulcanizates," by H. P. Burchfield, was originally scheduled for publication in the *India Rubber World*, it was submitted for publication to the American Chemical Society several months ago before its position in the contest conducted by the Chicago Rubber Group was determined. Submission of the paper to the A.C.S. was made with the knowledge and approval of the officers of the Chicago group, and it appeared under the title of "Qualitative Spot Tests for Rubber Polymers" in the December, 1945, issue of the *Analytical Edition* of *Industrial and Engineering Chemistry*.

A fourth paper, which was awarded an honorable mention by the judges, although it was not announced or presented at the meeting, will be published in an early issue of the *India Rubber World*. This paper, submitted by Leon J. D. Healy, consulting technologist of Milwaukee, Wisconsin, bears the same title as that of the contest itself, i.e., "On the Utilization of Cured Synthetic Rubber Scrap."

Boston Schedules Meeting

The Spring Meeting of the Boston Rubber Group will be held on Friday evening, March 8, in the Ball Room of the Copley Plaza Hotel in Boston, Mass. Two interesting papers on "flexible plastics" will be delivered, one on "Flexible Coatings and Adhesives," by C. W. Patton, manager, Coating and Adhesives Division, Bakelite Corp., and the other on "Calendering and Molding of Elastomeric Materials," by Gilbert Shaw, manager, Calendering and Molding Material Division, Bakelite Corp. A display of plastic products by the Bakelite organization is also planned.

Form Geneva Rubber Co.

A group of employees of the Johnson Rubber Co. have organized the Geneva Rubber Co., Geneva, Ohio, for the manufacture of light mechanical rubber goods. The group includes T. L. Atwood, W. T. Parker, L. H. Huff, and J. C. McMasters. Mr. Atwood will be factory manager. Equipment is now being installed in the Schaeffer Building on Austin Road in Geneva and the company hopes to begin operations within the next few months.

Jansen Joins "Rubber Age"

Charles T. Jansen

Charles T. Jansen, associated with the Wilmington Chemical Corporation since 1943, first as assistant to vice-president E. V. Osberg and later as technical sales representative, has left that organization and has joined the staff of RUBBER AGE as advertising manager. Mr. Jansen is also secretary-treasurer of the Rubber Reclaimers Association, Inc., and will continue to hold that post. Mr. Jansen was born in Jersey City, N. J., in 1911. Shortly after being graduated from high school in 1929 he joined the Rubber Manufacturers Association, remaining with that organization for 14 years before joining Wilmington Chemical. He started with the Association as a mail clerk, later becoming manager of the statistical department, and still later an assistant secretary. He also served at one time as Chairman of the Tire Accessories and Repair Materials Committee and for the first two years of the war prepared and edited the special bulletin issued by the Association on government price and priority actions. His work with RUBBER AGE will cover both general advertising and sales promotion.

Philadelphia Meets March 8

The next meeting of the Philadelphia Rubber Group will be held on Friday evening, March 8, at Kugler's Restaurant, Chestnut and Juniper St., Philadelphia, Penna. A two-paper symposium on the "Future Outlook for Rubber Hydrocarbons' 'will be presented, with Wallace E. Cake, assistant managing director, Plantations Division, U. S. Rubber Co., discussing the natural rubber viewpoint, and George R. Vila, assistant development manager, Naugatuck Chemical Division, U. S. Rubber Co., handling that of synthetic rubber. Entertainment will also be provided. Tickets for the dinner are $3.00 each.

CONNECTICUT RUBBER GROUP HOLDS INAUGURAL MEETING

The inaugural meeting of the newly-organized Connecticut Rubber Group was held in the Bridgeport Public Library in Bridgeport, Conn., on February 15. Approximately 165 attended the meeting, at the end of which 127 paid memberships were recorded.

The meeting was in the hands of Roger Bascom, of the B. F. Goodrich Chemical Co., one of the organizers, and featured talks by Everett G. Holt, until recently chief of the Commercial Research Section of the Rubber Development Corp. and now rubber advisor to the Office of Domestic Commerce of the Department of Commerce; Warren Lockwood, executive vice-president of the Rubber Manufacturers Association, and Dr. W. J. Sparks, associate director, Chemical Division, Esso Laboratories, Standard Oil Development Co.

Mr. Holt, the first speaker, discussed "The Outlook for Natural Rubber," in which he treated with both the short and long range viewpoints. From the long range angle, he predicted that consumption in the United States, now estimated at 60% of world supply, would gradually fall off until it represented approximately 50%, following the trend which developed after the first World War. For the short term, principally 1946, he pointed out that some 625,000 long tons was anticipated, 175,000 from areas other than Malaya, Sumatra and French Indo-China, 250,000 from stocks in the latter three areas, and 200,000 in new production from those areas.

Mr. Lockwood, the second speaker, first eulogized Mr. Holt for his seventeen years of continuous effort on the part of the over-all rubber industry, and then launched into an informal talk on general conditions in the industry. He warned manufacturers that they were making a mistake in "talking down" products made of synthetic rubber since such talk was neither in the national interest nor in their own, because national security dictates the continued production of substantial quantities of the synthetic product and continued control over allocation of supplies will guarantee the consumption of that synthetic.

Discussing "Synthetic Rubbers of the Future," Dr. Sparks, the final speaker, predicted that modified types of existing synthetic rubbers may be expected during the next few years. He stressed the point that new products, lacking the stimulus of wartime pressure, will require an extended period of research and development before attaining commercial importance. The new types now under investigation, he said, appear to reflect an increased appreciation of the importance of control of functionality and molecular structure. He indicated that polyesters, such as Paracon, and polyacrylic types, such as Lactoprene, were typical of the trend away from the classical polydiolefin approach.

COTTON COUNCIL DEMANDS INQUIRY ON RAYON CORD

At the annual meeting of the National Cotton Council, held recently in Memphis, Tenn., members charged that tests made by war agencies of rayon and cotton tire cord for the Army were prejudicial to the latter, and demanded a Congressional investigation of the manner in which the tests were conducted. It was pointed out that specifications requiring rayon cord for military tires and Federal aid for construction and enlargement of rayon plants have resulted in unwarranted danger to cotton's greatest peacetime market.

Six questions were propounded at the meeting to be answered under oath at the congressional inquiry. These questions were as follows:

(1) To what extent were the committees making final decisions regarding tire tests and expansion of rayon plants dominated by representatives of rayon companies, by former employees of rayon companies, or representatives of tire manufacturers affiliated with rayon companies?

(2) Is it true that those in charge of Army testing insisted that the newest and best in rayon tires be tested against cotton tires which did not contain the newest and best cotton cord?

(3) Were rayon plants financed or subsidized by the Federal government on the claim that they would be of no value after the war?

(4) How do the extravagant claims of government agencies that tremendous rayon expansion was essential to the winning of the war compare with the small amount of rayon that actually got to the battlefield?

(5) Has any government agency in charge of testing issued any statement which supports claims in current tire advertising that rayon is superior to cotton in passenger tires?

(6) Was consideration given to the fact that rayon loses strength whereas cotton gains strength because of water seepage when exposed to moisture for a long period?

Cotton Bloc May Help

To assure a prompt and complete airing of this cotton-rayon tire cord controversy which has been raging for the past several years, the Council is seeking the assistance of Southern Representatives and Senators in pushing the Congressional investigation. In addition the Council has planned to undertake an aggressive program of research, advertising and promotion.

The charges brought up at the Memphis convention were quickly refuted by a prominent rayon executive. He stated that although the cotton men apparently feel that rayon producers have taken unfair advantage of them, the synthetic industry has little to fear from any investigation, inasmuch as the whole matter of rayon tire cord production has been thoroughly inquired into several times before, principally by the Truman Committee.

If any inquiry is to be made, the rayon industry spokesman pointed out, the Army and the rubber companies are the sources to be investigated. Such an investigation, it was said, would show that although rubber companies were the producers of 75 per cent of the cotton tire cord output, they willingly "accepted the inevitable" and changed to rayon. Although this conversion was said to have resulted in a tremendous temporary setback, the rubber companies had no desire to be left behind in the competitive struggle, and the recognition of rayon was an illustration of the progressiveness of the tire manufacturers.

Commenting upon accusations that only one-third of the Government's rayon program went to military uses, the rayon industry spokesman declared that the Government regarded certain civilian needs as equal to Army and Navy needs. He pointed out that service tests have proven that cotton cords in trucks and bus tires did not last under high speed, heavy-load conditions. In the interest of the war effort, the spokesman concluded, heavy-duty trucks and busses were given equal priority with the military services for rayon cord tires which proved to run much cooler at high speeds, thus providing a greater safety factor.

Although the rubber industry, as a whole, has refused to take a definite stand in this heated controversy, a representative of one tire producer asserted recently that his company, in making its choice between natural and synthetic tire yarns, would keep abreast of the technological progress. Another spokesman asserted that although his concern is now using high-quality cotton yarns in passenger car tires, conversion to rayon yarns seemed inevitable, since tire engineers have long been convinced that synthetic yarns are a must in airplane and heavy-duty truck tires, and that opinion all along the line is swinging favorably toward rayon for passenger car tires.

German Synthetic Banned

According to an announcement made in Berlin by the four-power Allied Control Council, which is seeking to end Germany's ability to make war, the manufacture of synthetic rubber has been banned in Germany. Other items banned at the same time included synthetic gasoline, ammonia, ball and taper bearings, certain war chemicals and heavy machine tools. Germany will, however, be allowed to export certain products, including coal, coke, electrical equipment, spirits, toys, musical instruments and apparel.

PASSENGER TIRE PRODUCTION GAINED 1.55% IN NOVEMBER

Passenger car tire production rose 1.55% in November, increasing from 3,627,221 units to 3,683,522 units, according to the latest monthly report of the Rubber Manufacturers Association. Production for the first 11 months of 1945 was estimated at 24,355,933 units, as compared with 48,492,358 units in the first 11 months of 1941. The November, 1945, production was at the rate of 44,202,264 units a year.

Production of truck and bus tires was off 7.74% in November, amounting to 989,695 units, as compared with 1,072,711 units in October, while the output of passenger, truck and bus tubes declined 0.69%, from 4,274,444 in October to 4,245,000 in November. Production of truck and bus tires for the first 11 months of 1945 amounted to 15,320,159 as compared with 10,078,190 in the corresponding period of 1941.

Slight though it was, the advance in passenger car tire production was construed by the association to reflect an improving situation with respect to manpower and other factors which foreshadows rising production throughout the year ahead.

The report proves, however, that several months of increasing production will be required to fill civilian distribution pipelines which have been almost exhausted in the four war years and to establish adequate working inventories if passenger car tires are to be brought into anywhere near normal supply in 1946. Until this process of restoring balance has progressed appreciably, most of the new production should be channelled for distribution to emergency and hardship cases and the most essential drivers, the association said.

The report does not include tires for agricultural or aviation equipment, bicycles, motorcycles, industrial tires or solid rubber tires.

Goodyear Buys Topeka Plant

The large, though incomplete, government-built tire plant, located on a 75-acre site in Topeka, Kan., has been purchased by the Goodyear Tire & Rubber Co., Akron, Ohio. The purchase price was $5,669,269. Goodyear will complete the project and use it to produce tires for civilian consumption. When in full operation the plant, which has a total floor area of 536,000 square feet, will employ 1,600 workers. In addition to the three-story main building, structures include a power house, machine shop, service building, a two-story raw materials storage building, oil storage building, garage, and sewage disposal plant. The plant is completely equipped with the latest type of production machinery, including Banbury mixers, vulcanizers and mills. Goodyear was to have operated the Topeka plant for the government but Federal funds were withdrawn before it could be put into production.

COLLYER SPEAKS ON RUBBER AT ANNUAL S.A.E. MEETING

John L. Collyer, president of the B. F. Goodrich Co., Akron, presented a talk on the "Outlook for Rubber for the Automotive Industry—Synthetic and Natural" at the annual meeting of the Society of Automotive Engineers, recently held at the Book-Cadillac Hotel, in Detroit, Mich.

Mr. Collyer pointed out that the automobile and rubber industries of America had worked together effectively, submitting the statistics that tires and tubes normally account for between 70 and 75 per cent of the total national consumption of rubber. In addition, rubber uses other than tires in automobiles are likely to grow even larger, he said, creating on the part of the automotive engineers a more than casual interest in the economics of rubber and the supply and costs outlook.

Discussing a pattern for a world rubber policy, Mr. Collyer declared that a prime reality to be faced is that the United States must always have unfailing sources of rubber to assure its military security. He stated that natural rubber is no longer indispensable, the utility of synthetic rubber as an alternative having been amply demonstrated. Some $700,000,000 has been spent for the construction of synthetic rubber plants which are in existence today and the development of the synthetic rubber industry has produced new materials that now have advantages for many purposes.

Continuing his discussion of synthetic rubber, Mr. Collyer stated that the cost gap—in terms of finished product performance between natural and synthetic rubber—has been steadily narrowed. Continuance of synthetic rubber production will affect substantially the economies of the natural rubber producing areas and of the countries which have heavy investments in plantations, he added.

According to Mr. Collyer, the world faces an inevitable surplus of rubber productive capacity over the most optimistic estimates of requirements. Despite the liberation of the Far Eastern rubber lands, the potential ability of the world to produce natural rubber is much the same as before the war—approximately 1,600,000 tons a year, he declared. With the world's annual capacity to produce synthetic rubber of some 1,400,000 tons, the potential annual rubber supply of the world will be 3,000,000 tons. However, the most conservative estimates of world demand for rubber during the immediate postwar years have been set at 1,500,000 tons annually, creating a situation of a vast oversupply as natural rubber production increases.

Mr. Collyer recommended that, for purposes of national security, the United States accumulate a stockpile of natural rubber and maintain in operating condition plants capable of producing 600,000 to 700,000 tons of synthetic rubber annually. He proposed that at least 200,000 tons be kept in production regardless of economic factors, the output to include approximately 100,000 tons of special purpose synthetics, including Butyl. Many of these synthetic products should be consumed by the military and other agencies of the government, he said.

Explaining that estimates place America's rubber needs for the next five years at an average of 825,000 tons annually, or 25 per cent over 1940, Mr. Collyer stated that after providing 200,000 to 300,000 tons of security synthetic rubber, there will be left an average of 525,000 to 625,000 tons, with choice of materials to be governed by competition.

Expansion of the uses of rubber and the maintenance of competition between natural and synthetic rubber were constructive forms of attack against the rubber surplus problem recommended by Mr. Collyer. He predicted that if average annual consumption for the rest of the world could be increased to two pounds per capita (now eight-tenths of a pound per capita per year as compared with 14 pounds per capita in the United States), world demand would be augmented by 1,000,000 tons.

Civilian production of rubber filtering material used during the war to strain blood plasma for wounded soldiers has been resumed by U. S. Rubber. Natural rubber is used.

Braidwood Joins Yale Rubber

Clinton Braidwood

Clinton Braidwood, formerly assistant director of research on surface coatings with Reichhold Chemicals, Inc., and previously associated with the U. S. Rubber Co., has joined the Yale Rubber Manufacturing Co., Yale, Mich., as supervisor of its new products development division. Mr. Braidwood is one of the developers of Agripol, and also did extensive work with ester plasticizers.

WESTERN RESERVE LAUNCHES 5th ANNUAL LECTURE SERIES

Western Reserve University will start its fifth annual lecture series on "Frontiers in Chemistry" on March 1, bringing 12 distinguished American scientists to Cleveland to discuss latest developments in the field of catalysts and high polymers. The lectures are designed chiefly for working chemists and graduate students of chemistry.

The speakers and their subjects include: Hugh S. Taylor, professor of chemistry and dean of the Graduate School, Princeton University, "The Catalytic Surface and the Kinetics of Catalytic Reactions," March 1; Otto Beeck, associate director of research and head of the physics department, Shell Development Company, "Some Fundamental Aspects of Metal Catalysts," March 8; Vasili I. Komarewsky, professor of chemistry and director of the Catalytic Laboratories, Illinois Institute of Technology, March 15; Charles C. Price, professor of chemistry, University of Notre Dame, "Catalysis in Polymerization — Structural Factors Affecting Polymerization," March 22; Ludo K. Frevel, research physicist and chemist, Dow Chemical Company, "X-Ray Analysis of Catalysts," March 29; E. V. Murphree, vice-president, research and development department, Standard Oil Development Company, "Fluid Catalytic Cracking," April 5.

Hermann H. Mark, professor of organic chemistry and director of the Polymer Research Institute, Polytechnic Institute of Brooklyn, "Recent Progress in Polymer Chemistry," April 19; M. L. Huggins, research chemist, Eastman Kodak Company, "Structure and Properties of High Polymers," April 26; W. O. Baker, member of the technical staff, Bell Telephone Laboratories, "Principles of Structure Within and Among Polymer Chains," May 3; Eugene Rochow, research chemist, General Electric Company, "The Chemistry of Silicone Polymers," May 10; Waldo L. Semon, director of pioneering research, The B. F. Goodrich Company, "Synthetic Rubber, from Theory to Practice," and Theodore F. Bradley, chief of the coating materials section, organic chemicals division, "Recent Progress in the Chemistry and Technology of Drying Oils," May 24.

Each speaker will present two related lectures, the first from 5:15 to 6:05 p.m. and the second from 7:45 to 8:35 p.m. in the Morley Chemical Laboratory on the Western Reserve campus, Adelbert Road near Euclid Avenue, Cleveland.

Baker Expands Home Office

As a part of its current expansion program, the J. T. Baker Chemical Co. has moved its sales, quotation, export and statistical research departments from the main plant to newly remodeled and more spacious quarters on Main Street, Phillipsburg. All mail will continue to be addressed to Phillipsburg, N. J.

CONSULTING TECHNICAL COMMITTEES OF THE CPA RUBBER DIVISION

Five new consulting technical committees have been formed since V-J Day, making a total of 22 such groups which are now assisting the Rubber Division of the Civilian Production Administration in charting the steps to be taken to provide the rubber manufacturing industry with increased amounts of natural rubber. These committees help to decide where and when natural rubber can best be used during the period when supplies are short.

The new committees recently organized are those for chemically blown sponge, foamed latex products, rubber band, rubber thread and rubber toy manufacturers. None of these were allowed natural rubber during the war. The other 17 committees were appointed at various times by the Office of the Rubber Director and the WPB Rubber Bureau. Members making up all of the 22 existing committees are as follows:

Brake Lining: H. F. Groendyk, Manhattan Rubber Mfg.Division, Raybestos-Manhattan, Inc., Passaic, N. J., Chairman; W. Dodge (Ferodo & Asbestos); William Nanfeldt (Firestone); C. A. Schell (Thermoid); Edward Wells (Johns-Manville); R. E. Spokes (American Brakeblok).

Chemically Blown Sponge: J. F. McWhorter, Ohio Rubber Co., Willoughby, Ohio, Chairman; George Sprague (Sponge Rubber Products); U. H. Parker (Dryden Rubber); H. S. Liddick (Davidson Rubber); Marcus Orr (Goodrich); Stanton Glover (U. S. Rubber).

Foamed Latex Products: J. J. Allen, Firestone Rubber & Latex Products Co., Fall River, Mass., Chairman; W. M. Reid (Dunlop Rubber); M. Berman (Hewitt Rubber); E. C. Svendsen (U. S. Rubber); Marcus Orr (Goodrich); C. H. Barnes (Goodyear).

Gas Mask: H. A. Winkelmann, Dryden Rubber Co., Chicago, Ill., Chairman; E. A. Norris (Acushnet Process); G. M. McClelland (Continental Rubber); M. J. Sanger (General Tire); R. W. McGahey (Goodrich); H. N. Jackson (U. S. Rubber); S. C. Nicol (Goodyear); H. A. Anderson (Mine Safety Appliance); J. A. MacKay (Sun Rubber); W. S. Chinery (Industrial Rubber Goods Co.); G. A. Kanavel (Vulcanized Rubber).

Grinding Wheel Manufacturers: J. N. Kuzmick, Manhattan Rubber Mfg. Div., Raybestos-Manhattan, Inc., Passaic, N. J., Chairman; N. V. Allison (Allison Co.); C. E. Drake (U. S. Rubber); F. G. Burk (A. P. deSanno & Sons); C. J. Waterman (Bancroft-Hickey); H. C. Martin (Carborundum).

Hard Rubber: D. E. Jones, American Hard Rubber Co., Butler, N. J., Chairman; F. S. Malm (Bell Telephone Labs.); H. J. Flikkie (Goodrich); H. E. Case (Luzerne Rubber); E. R. Kellehey (Richardson); E. R. Laning (Joseph Stokes Rubber); C. P. Morgan (Vulcanized Rubber).

Industrial Pressure-Sensitive Tape: V. N. Morris, Industrial Tape Corp., New Brunswick, N. J., Chairman; P. F. Ziegler (Bauer & Black); H. J. Tierney (Minnesota Mining & Mfg.); A. R. Gow (Seamless Rubber); C. E. Frick (Van Cleef Bros.).

Insulated Wire and Cable: R. A. Schatzel, Rome Cable Corp., Rome, N. Y., Chairman; E. D. Youmans (Okonite); S. J. Rosch (Anaconda Wire); A. R. Kemp (Bell Telephone Labs.); A. D. Cummings (Collyer Insulated Wire); J. T. Blake (Simplex Wire); John Ingmanson (Whitney Blake).

Jar Ring: F. W. Frerichs, Cupples Co., St. Louis, Mo. Chairman; Harold Anderson (Ball Bros.); C. C. Davis (Boston Woven Hose & Rubber); L. J. DeHoltzer (Crown Cork & Seal); L. J. Howell (Hamilton Rubber Mfg.); G. P. Mooshegranz (Jenkins Bros.); A. R. Brandt (Schacht Rubber Mfg.); R. D. Gartrell (U. S. Rubber); E. A. Schwartz (Crunden Martin).

Mechanical Rubber Goods: W. L. Smith, B. F. Goodrich Co., Akron, Ohio, Chairman; W. W. Sanders (Boston Woven Hose & Rubber); N. R. Karrer (Electric Hose & Rubber); F. C. Thorn (Garlock Packing); D. F. Harpfer (Goodyear); L. J. Howell (Hamilton Rubber); M. Berman (Hewitt Rubber); W. L. White (Manhattan Rubber); C. H. Zieme (Republic Rubber); G. J. Wyrough (Whitehead Bros. Rubber); M. J. Sanger (General Tire); Harry Ebert (Firestone); J. F. McWhorter (Ohio Rubber).

Medical and Surgical Rubber Goods: A. R. Gow, Seamless Rubber Co., New Haven, Conn., Chairman; H. S. Liddick (Davidson Rubber); Ezra L. Hanna (Davol Rubber); A. E. Hosier (Faultless Rubber); R. J. Limbert (Lee Rubber); C. R. Porthouse (Pyramid Rubber); Elmer Brueggeman (Seiberling Latex Products); George Lenhart (Wilson Rubber); S. E. Strickhauser (U. S. Rubber); M. O. Orr (Goodrich).

Protective Clothing: Dale Lovell, U. S. Rubber Co., Mishawaka, Ind., Chairman; Harry Dannenbaum (Aldan Rubber); Charles Dennison (Archer Rubber); Hewitt MacPherson (Cambridge Rubber); G. R. Spangenberg (Chicago Rubber Clothing); A. F. Schildhauer (DuPont); John W. F. Young (Federal Leather); Joseph L. Haas (Hodgman Rubber); R. R. Lewis (Vulcan Proofing); M. O. Orr (Goodrich).

Rubber Band: Marcus Orr, B. F. Goodrich Co., Akron, Ohio, Chairman; C. W. Howett (Hodgman Rubber); Garrett Roberts (Weldon Roberts Rubber).

Rubber Footwear: Charles H. Baker, Chas. A. Baker, Inc., Providence, R. I., Chairman; A. H. Wechsler (Converse Rubber); Henry A. Stuart (Goodyear); H. W. Martin (Hood Rubber); J. H. Kelly (Tyer Rubber); V. N. Hastings (U. S. Rubber).

Rubber Mountings, Shock Absorbers and Dampers: John D. Morron, U. S. Rubber Co., Detroit, Mich., Chairman; R. C. Knapp (U. S. Rubber); Harry L. Ehert (Firestone); M. J. Sanger (General Tire); H. H. Fink (Goodrich); H. E. Wening (Inland Mfg. Div.); J. F. McWhorter (Ohio Rubber); R. C. Henshaw (Lord Mfg.); E. G. Kimmich (Goodyear); Sherman R. Doner (Manhattan Rubber).

Rubber Thread: W. L. Smith, B. F. Goodrich Co., Akron, Ohio, Chairman; H. E. Elden (Dunlop Tire); G. R. Keltie (American Wringer); J. T. Brogden (Carr Mfg.); J. J. Allen (Firestone); T. E. Cooper (U. S. Rubber); R. L. Cragan (Lloyd Mfg.).

Rubber Toys: John MacKay, Sun Rubber Co., Barberton, Ohio, Chairman; Elmer Brueggeman (Seiberling Latex); Marcus Orr (Goodrich); P. H. Watkins (Eagle Rubber); John Shira (Oak Rubber); Leonard Mohselder (Barr Rubber); H. W. Gill (National Latex).

Soles and Heels: W. E. Kavanagh, Goodyear Tire & Rubber Co., Windsor, Vt., Chairman; R. W. Lowe (Endicott-Johnson); R. E. Hughes (International Shoe); L. F. Leatherman (Gro-Cord Rubber); Arthur Ross (Panther-Panco Rubber); C. F. Hoover (Essex Rubber); W. F. Ridge (U. S. Rubber); Allen O'Neal (Goodrich).

Dental Rubber Manufacturers: W. P. Keith, Hygienic Dental Rubber Co., Akron, Ohio, Chairman; R. B. Savin (S. S. White Dental Mfg.); T. A. Swartz (S. S. White Dental Mfg.); S. D. Milroy (Claudius Ash Sons); G. P. Wannemacher (Claudius Ash Sons); W. L. Tepper (Martin Rubber); Hobart Corning (Corning Rubber); R. H. Mercer (American Dental Trade Assoc.); G. A. Lilly (American Dental Trade Assoc.); R. W. Fuller (E. J. McCormick Rubber).

Surgical Adhesive Tape: P. F. Ziegler, Bauer & Black, Chicago, Ill., Chairman; John Clark (Bay Division); David Smith (Johnson & Johnson); Arthur Gow (Seamless Rubber).

Tire and Tube: H. E. Elden, Dunlop Tire & Rubber Co., Buffalo, N. Y., Chairman; H. J. Niemeyer (Firestone); H. B. Pushee (General Tire); W. H. Denton (Goodrich); J. E. McCarty (Goodyear); H. P. Partenheimer (Mansfield Tire); W. F. Hoelzer (Pennsylvania Rubber); E. H. Gibbs (Seiberling Rubber); L. B. Martin (U. S. Rubber); R. Brasaemle (Lee Tire); A. H. Nellen (Lee Tire).

Tire and Tube Repair Materials: T. E. Boyle, B. F. Goodrich Co., Akron, Ohio, Chairman; B. C. Eberhard (Goodyear); H. F. Webster (Denman Tire); F. C. Theiss (General Tire); R. J. Bonstein (Firestone); N. E. Ries (Mohawk Tire); D. A. MacDonald (U. S. Rubber); L. L. Fortune (Fremont Rubber).

STATEX-B*

*TODAY'S BEST ANSWER
TO LONGER TIRE LIFE

• A COLUMBIAN COLLOID •

COLUMBIAN CARBON CO. BINNEY & SMITH CO.

MANUFACTURER DISTRIBUTOR

STATEX-B

With Statex-B generally available due to increased production it is now possible for compounders to take full advantage of its quality-building properties. . . .

In heavy duty treads

Statex-B has an area of 8 acres, and a very narrow range of particle sizes. These characteristics contribute to a combination of

GOOD ROAD WEAR (**no coarse particles**)
LOW HEAT BUILD-UP (**no extremely fine particles**)

In inside tire parts

Stocks for carcasses, cushions and breakers made with Statex-B or Zinc Oxide are equally cool running, but Statex-B compounds show greatly improved flex life. Lower specific gravity results in less weight and a 5 to 10% reduction in volume cost in favor of the carbon stock.

Today's best answer to longer tire life is

STATEX-B

●

FURNEX
The High Resilience Carbon

MICRONEX *For 30 years*
the Standard Reinforcing Carbon

COLUMBIAN CARBON CO.
MANUFACTURER

BINNEY & SMITH CO.
DISTRIBUTOR

Martin Plans Marvinol Plant

Glenn L. Martin Co., Baltimore, Md., has announced that it is ready to begin commercial manufacture of Marvinol, and has authorized construction of a new $1,500,000 plant. The plant, which is expected to be in production by next fall, ultimately will have an annual capacity of about 11,000,000 lbs. of the polyvinyl resins and will be operated by the Plastics and Chemicals Division of the company. Incorporated in this Division's activities will also be a customer service laboratory devoted to the development of new uses for Marvinol type resins. This laboratory already has been established in Baltimore, Md. The company also has announced several new developments made by its Plastics and Chemicals Division. Among them are leather-like resin coated fabrics for use as interior finishes in the Martin airliners, and a new type of shoe soling, similar to leather soles, but superior in wear resistance and completely impervious to water.

Goodyear Purchases Airships

Seven "L" type airships have been purchased by the Goodyear Tire & Rubber Co. from the government. The "L" ships were patterned after the Goodyear blimp fleet which saw patrol duty in the early part of the war until the larger "K" and "M" type airships could be built. Goodyear will use the new ships primarily for demonstration and experimental purposes, as part of a program to establish trans-oceanic travel by full size rigid airships.

Data on U.R.W.A.

To circumvent criticism leveled at some of its operations, the CIO recently issued some pertinent information concerning most of its affiliated unions. Data pertaining to the United Rubber Workers of America, the rubber union, indicated that the annual salary of the highest paid officer amounted to $4,500; the initiation fee was $2.00; the books are audited by a certified public accountant; financial reports are published; conventions are held annually; and officers are elected annually.

Ontario Meets February 21

The next meeting of the Ontario Rubber Section of the Chemical Institute of Canada will be held on Thursday, February 21, in the Chemistry Building, University of Toronto, Toronto, Canada. J. M. Ball, Eastern representative of the Midwest Rubber Reclaiming Co., East St. Louis, Ill., will deliver an address on "Reclaimed Rubber During Reconversion." Mr. Ball will discuss reclaims made from tire scrap containing synthetic rubber, the composition of present and future tire scrap with respect to synthetic and natural rubber, and the various reclaims and test results of laboratory work. Slides will be shown to further illustrate the subject.

Thomas Retires as Chairman

John W. Thomas, associated with the Firestone Tire & Rubber Co. since 1908 and principal proponent of the company's research laboratories, retired as chairman of the board on his 38th anniversary with the company last month. Mr. Thomas remains as director and honorary chairman, in which capacity he will serve as consultant and adviser. Joining the Firestone organization in 1908, Mr. Thomas became a director of the company in 1916, was elected a vice-president three years later, and became president in 1932. Last year, in recognition of his contributions to rubber chemistry, Mr. Thomas was awarded the gold medal of the American Institute of Chemists. He also received an honorary degree of doctor of science last year from the University of Akron, his alma mater. Since no new chairman of the board has been named, Harvey S. Firestone, Jr., who was recently re-elected president of the company, has become head of the firm.

Textile Symposium for Chicago

The Chicago Rubber Group will hold a Symposium on the Use of Textiles in the Rubber Industry at its next meeting, to be held on Friday evening, March 22, at the Hotel Morrison in Chicago, Ill. Speakers participating in the symposium will include Henry S. Grew, Jr., vice-president, Wellington-Sears Co.; Dr. W. W. Owen, of the DuPont Rayon Division; and W. H. Atkinson, Chicago branch manager, Owens-Corning Fiberglas Corp.

NEW POLYMERS AUTHORIZED BY OFFICE OF RUBBER RESERVE, RECONSTRUCTION FINANCE CORPORATION

Listed below are types and properties of new experimental GR-S polymers (including GR-S latices) which have been authorized by the Office of Rubber Reserve, Reconstruction Finance Corporation, since publication of those listed in our preceding issue. Procedures for the distribution and sale of these polymers will be found in our October, 1945, issue.

X = Number Designation	*Manufacturing Plant*	*Date of Authorization*	*Polymer Description*	*Special Characteristics*
X = 280	Goodrich Port Neches	12/18/45	Same as GR-S-10 with a minor change in plant practice to achieve higher production rate.	Same purpose use as GR-S-10.
X = 281	Goodrich Borger	1/10/46	Polyisoprene	Produced for uses as an intermediate material in chlorinated and other chemically treated end products. Similar in chemical properties to natural rubber.
X = 282	Goodrich Louisville	1/14/46	GR-S-10 made by continuous polymerization.	Same purpose as GR-S-10.
X = 283	U. S. Rubber Institute	1/23/46	A masterbatch containing 100 parts Buca A Clay to 100 parts GR-S; Short-stopped with sodium sulfide.	Clay masterbatches are reported to have superior processing and handling characteristics. For use in stocks requiring this type of material.

NOTE: The description of Experimental Polymer X-271-GR-S in our December, 1945, issue indicated a high solids content of 50 to 55%. The solids content of this polymer is actually 55 to 60%.

NAMES IN THE NEWS

SAM DUPREE, associated with the Goodyear Tire & Rubber Co. for the past 12 years, most recently in the mechanical goods development department, has been appointed manager of the company's industrial molded goods sales.

SIMON ASKIN, assistant secretary of the Heyden Chemical Corp., New York 1, N. Y., has been elected a director of the American Plastics Corp.

WILLIAM L. PLATT, who has been associated with the Columbia Chemical Division of the Pittsburgh Plate Glass Co. for the past 16 years in various capacities, has been appointed sales representative of the division.

RAYMOND E. CALLAHAN, control manager of the Charlotte, N. C., plant of the U. S. Rubber Co., and associated with that company since 1935, has been appointed administrative assistant to ERNEST G. BROWN, vice-president and general manager of the company's mechanical goods, general products and "Lastex" yarn and rubber thread divisions.

B. W. ROSS, recently discharged from the Army after more than three years of active service, has returned to his duties as sales engineer with the Consolidated Products Co., New York 7, N. Y.

K. C. GARDNER, JR., formerly assistant to the general manager in charge of operations of the United Engineering & Foundry Co., Pittsburgh, Penna., has been named vice-president in charge of operations.

GEORGE E. PEACE, associated with the Johnson Steel & Wire Co. for many years, was recently re-elected vice-president and general manager of the company's Akron plant.

FRANK MALM, research chemist of the Bell Telephone Laboratories, Murray Hill, N. J., recently completed his 40th year of service with that concern.

O. S. DOLLISON, vice-president of the Republic Rubber Division of the Lee Tire & Rubber Co., was recently named general manager of the Youngstown, Ohio, plant.

FRANK G. OSWALD, formerly manager of the technical service division, Synthetics Department, Hercules Powder Co., Wilmington, Del., has been appointed assistant sales director of that department, and will assist in general sales policies, sales training, and in coordination of technical sales activities.

EDWARD H. ROBBINS, associated with the Flintkote Co. for the past several years, is now associated with Atlas Rubber, Inc., Delawanna, N. J., as chief chemist.

K. M. TEWEL, formerly associated with the B. F. Goodrich Co., has joined the Schacht Rubber Manufacturing Co., Huntington, Ind., as chief chemist.

ALEXANDER CROMWELL, vice president of the Johns-Manville Corp., since 1937, who has been acting as supervisor of production at the Kansas ordnance plant, has been appointed production manager of all fourteen factories in the United States.

R. B. BOGARDUS, after nearly four years in Washington, D. C., with the Rubber Development Corp., has returned to his job as assistant manager of crude rubber purchasing of the Goodyear Tire & Rubber Co.

BERT R. PRALL, formerly vice-president and general manager of operations of Montgomery Ward & Co. and a member of its board, has been appointed executive vice-president of the Dayton Rubber Manufacturing Co., Dayton, Ohio.

ROGER S. FIRESTONE, recently relieved from active duty in the navy and formerly president of the Firestone Rubber & Latex Products Co., Fall River, Mass., has been named manager of the new products department of the parent Firestone Tire & Rubber Co.

E. T. HANDLEY, formerly manager of the Firestone Tire & Rubber Co. plant in Des Moines, Iowa, has sailed from New York to take charge of the company's plant in Viskafors, Sweden.

CHESTER E. CARROLL, who has been serving as assistant general manager of the Associated Lines Tire and Accessory Sales Division of the B. F. Goodrich Co., since 1935, has been named general manager of that division, succeeding HARRY E. KELLER, resigned.

F. B. HAVENS, formerly vice-president and chief chemist of the Prince Manufacturing Co., Bowmanstown, Pa., has been appointed to the technical service staff of the Pigment Department, Calco Chemical Division, American Cyanamid Co., Newark, N. J.

FRANK S. RUTTER, well known in commodity circles, is now associated with Littlejohn & Co., Inc., 120 Wall St., New York 5, N. Y. He joined the commodity organization on February 1.

RALPH W. SOHL, a member of the tire development department of the Goodyear Tire & Rubber Co. for the past 30 years, has been named farm tire development manager, succeeding the late ELMER F. BRUNNER.

ROBERT D. FRANKLIN, associated with the B. F. Goodrich Co., Akron, since 1927, originally as a time study engineer, has been named manager of the textiles, cotton, advertising and paper products department of the company's purchasing division. He succeeds M. N. TWYMAN, who has established his own business.

J. S. PROTZEL, associated with the Cambridge Rubber Co. for the past 20-odd years, has been named sales manager for the Bristol Manufacturing Corp., Bristol, R. I. He occupies a similar post with Maurice C. Smith & Co., of New York City.

R. W. FITZGERALD, manager of the Detroit district for the Goodyear Tire & Rubber Co. for the past few years, has been named Western division manager of the company, with headquarters in Los Angeles, succeeding the late E. L. MEFFORD.

HENRY P. PRYOR, who was associated with the R. T. Vanderbilt Co. prior to entering military service in 1942, and who was named chief chemist of the Rodic Rubber Corp. recently after his discharge from the service, has left Rodic to organize a plastics department for the Royal Lace Paper Works of Brooklyn, N. Y.

DAN A. KIMBALL, associated with the General Tire & Rubber Co. since 1920, when he joined the company as a salesman in the Pacific Coast territory, has been elected vice-president in charge of special operations. He will direct the operations of the Aerojet Engineering Corp., a subsidiary, and the General Tire Co. of California.

PRESTON B. BERGIN, war production drive administrator for the B. F. Goodrich Co. for the past few years, has left that company to become legislative correspondent for the American Retail Federation at Washington, D. C.

C. C. RYDEN, who has been president of the Ryden Manufacturing Co., Plymouth Meeting, Penna., for the past few years, has joined the MacGregor Golf Co., Cincinnati, Ohio.

GEORGE E. KELSHEIMER, associated with the Indianapolis, Ind., plant of the U. S. Rubber Co. for the past few years, has joined the Rose Rubber Products Co., Nashville, Tenn.

J. H. MCMURRAY, formerly director of engineering and construction, Calco Chemical Division, American Cyanamid Co., has been appointed an assistant manager of the Division.

Gulick Promoted by Goodrich

J. E. Gulick, general superintendent of the De-Icer and Fuel Cell Division of the B. F. Goodrich Co. since October, 1941, has been named general manager of the tire manufacturing division of the company. He succeeds A. W. Phillips, who has resigned from the company to join the General Tire & Rubber Co. Mr. Gulick was born in Akron and is a graduate of the College of Engineering of the University of Akron. He entered the rubber industry in 1923 after holding several production and engineering assignments in another field, and went with Goodrich in 1927 as a tire development engineer. He was named production superintendent of the Akron tire division in 1932 and later became a tire sales engineer and staff superintendent in that division. In 1934 he was named factory manager of the company's plant in Kitchener, Ontario, Canada, and five years later became manager of the interplant operations department with headquarters in Akron. He was sent to Europe for several months in 1939 to make a study of plants with which the company had associations, and made a similar study in South America in 1940. In 1941 he was sent to Los Angeles as factory manager of the company's plant, and returned to Akron a short time later to head the De-Icer and Fuel Cell Division.

Flexol Plasticizer TOF

Flexol Plasticizer TOF (trioctyl phosphate), a new plasticizer, is now available in limited quantities from the Carbide & Carbon Chemicals Corporation, New York City. Advantages claimed for it include low-temperature flexibility, minimum change in flexibility over a wide temperature range, high resistance to water extraction, and low volatile loss. It is compatible with vinyl chloride, vinyl chloride-acetate and vinyl butyral resins, and the principal types of synthetic rubber, as well as with ethyl cellulose and cellulose nitrate. It is said to be especially effective in spreader and calender coatings for cloth where pliability and good drape are desired.

Cabot Agent Visiting America

Otto Eskens, representative in ten European countries for Godfrey L. Cabot, Inc., is currently visiting the United States to renew business associations in Boston and elsewhere which were broken off by the German occupation of Holland in the first year of the war. Mr. Eskens, who maintains headquarters in Amsterdam, was in that city when the Germans arrived in May, 1940, and beginning May, 1942, spent almost a year in a prison camp as a hostage. His visit in the United States will take him all the way to the Texas Panhandle to visit Cabot carbon black plants located in that area. He plans to return to Amsterdam sometime during March.

Davis with Standard Chemical

M. E. Davis, associated with the J. M. Huber, Inc., since 1940 as rubber service manager, has been put in charge of a new branch office of the Standard Chemical Co. at 901 Broad Street Bank Bldg., Trenton, N. J. Equipped with complete

M. E. Davis

warehouse facilities, the new office will serve the Middle-Atlantic States area. After Mr. Davis acquired his B.S. degree in chemistry at the University of Illinois in 1931, he joined the A. O. Smith Corp. as research chemist. In 1933 he joined the general laboratories of the B. F. Goodrich Co. in Akron, was later transferred to the raw materials department, and then served as factory compounder in the mechanical goods division. He resigned from Goodrich in 1937 to assume duties as a compounder in the mechanical goods plant of the General Tire & Rubber Co. at Wabash, Ind. In 1940 Mr. Davis joined the J. M. Huber technical sales staff.

MIT Opens Acoustics Laboratory

Establishment of an acoustics laboratory as a new interdepartmental facility was announced recently by the Massachusetts Institute of Technology. One of the primary objectives of the new laboratory is to provide fundamental professional training in a field in which there is now a serious shortage of competent engineers and scientists. The laboratory, under the direction of Dr. Richard H. Bolt, assistant professor of physics, is to be operated under the joint supervision of the Institute's Department of Physics and Electrical Engineering and the School of Architecture and Planning. It will collaborate with all departments interested in acoustic problems.

Rubber-Flo and Rubber-Sol

Two new products — Rubber-Flo, a mold lubricant, and Rubber-Sol, for salvaging metal parts from rubber—have recently been developed and introduced by the Preventive Maintenance Co., 1997 Fairfield Ave., Bridgeport 5, Conn. Rubber-Flo is said to keep molds cleaner for longer periods than similar types of mold lubricants and give greater lustre to the finished product. It gives equal satisfaction on all kinds of rubber. The metal parts of rubber-to-metal products can be salvaged by simply immersing the products in Rubber-Sol and then stripping the rubber from the metal. Although the immersion period varies somewhat with the type of rubber involved, twenty-four hours is usually sufficient. Rubber-Sol can also be used to remove uncured rubber from screens, knives, valves, machines or any metal pieces. It will not injure the metal in any way, according to the manufacturers, and can also be used to remove paint, varnish or gum. Experiments are now being made to determine a practical method for using the material in cleaning latex pipe lines.

Mansfield Expands Sales Forces

Expansion of its sales forces to keep pace with expanded production facilities has been announced by the Mansfield Tire & Rubber Co. Appointed to spearhead the enlarged merchandising program are Edward E. Evans as assistant general sales manager, S. E. Shepard as director of merchandising, C. F. Orr, Jr., as district sales manager, and L. M. Baker as manager of the technical division. Mr. Baker was formerly manager of the technical division of the Lake Shore Tire & Rubber Co., Des Moines, Iowa, and was previously associated with the Firestone Tire & Rubber Co., Akron, Ohio, for ten years.

Columbia Chemical Moves Offices

Executive offices of the Columbia Chemical Division of the Pittsburgh Plate Glass Co. are now located on Fifth Avenue at Bellefield, Pittsburgh 13, Penna. The telephone number is Mayflower 2960. These are temporary quarters which have been necessitated by the lack of sufficient space at the division's former address to accomodate personnel returning from military service and other expansions of the Columbia organization.

Tow Sentenced by Court

Irving Tow, former general manager of the American White Cross Laboratories, Inc., New Rochelle, N. Y., has been sentenced to six months in prison for diverting finished cotton goods that had been obtained for military surgical dressings. Mr. Tow pleaded guilty to 19 counts in an indictment charging him with diverting the goods.

FINANCIAL NEWS

NET INCOME OF $13,024,778 REPORTED BY U. S. RUBBER CO.

Net income of $13,024,778 for 1945, after deducting all charges, including provisions for Federal and foreign income taxes and all known expenses relating to the war, has been reported by the U. S. Rubber Co. After allowing $8.00 a share on the preferred stock, this was equal to $4.44 a share on the common stock, which compares with a net of $15, 832, 613, or $6.04 a common share, in 1944.

Consolidated net sales in 1945 reached a new high of $471,506,473, an increase of 6.4% over sales of $443,077,453 reported for the previous year, which had been an all-time high up to that point. As in previous years, 1945 sales do not include a substantial volume of production in munitions and synthetic rubber plants operated by the company for the government on a cost-plus-fixed-fee basis. This production amounted to more than $310,000,000, for which a fee of $4,940,-958 was received.

There was a write-off of an unamortized balance of $24,496,634 expended under Certificates of Necessity in the purchase and construction of buildings, machinery and equipment during the war period. This resulted in a net charge against 1945 earnings of $1,857,383 after Federal income taxes and applicable renegotiation funds for the years 1941 to 1945 inclusive. A war reserve of $1,250,-000 which was set aside in 1943 was returned in 1945 to earnings. It was considered unnecessary to make any provision for contract renegotiation on 1945 business. Direct taxes aggregating $47,-025,988 were charged against operations in 1945, in comparison with $57, 584,271 for the previous year.

Pointing to the fact that the company is in the strongest financial condition in its history, the report shows net working capital increased to a new peak of $110,-070,924 from $93,732,772 at the end of the previous year. Current assets amounted to $167,567,570 and current liabilities were $57,496,646, compared with $157,209,948 and $63,477,176, respectively, a year earlier. Of last year's current assets, $36,224,764 was cash and U. S. Treasury Bonds, compared with $27,479,654 in 1944.

Foreign assets increased to $21,346,741 from $15,542,854. This increase was accounted for principally in Canada where assets rose to $15,719,302 from $12,295,-126, and in Latin America where an increase to $3,611,165 from $1,445,875 was recorded. In 1945 a footwear plant was placed in operation near Havana, Cuba. Also, the tire plant in Mexico City was expanded and additional capital stock in the subsidiary corporation which operates it was acquired.

It is not possible as yet, the report states, to make any appraisal of the present value of the rubber plantations which the company owned in Malaya and Sumatra, of the chances of early operation, or of the expenditure which may be necessary to put them back into operation. When the plantations are recovered by the company, their value will be determined and reflected in the accounts.

During the year the company purchased a mill for twisting and weaving rayon cord and fabrics built by the company in 1944 for the Defense Plant Corporation at Scottsville, Va. Three munitions plants operated for the government at Des Moines, Iowa, Charlotte, N. C., and Joliet, Ill., were closed shortly after the ending of hostilities.

Total additions to property and plants in 1945 amounted to $26, 644,090. Deductions were $10,980,290 for depreciation, $26,496,634 for write-off of war facilities, and $528,409 for disposals and adjustments, or a total of $38,005,333. Therefore, there was a net decrease of $11,361,243.

The average number of employees in 1945 was 70,739, as compared with 78,347 in 1944. They received a total of $183,488,762 in wages and salaries, equal to $2,594 per employee, which compares with the 1944 amount of $189, 766,092, equal to $2,423 per employee.

ARMSTRONG RUBBER COMPANY REPORTS NET OF $299,339

Armstrong Rubber Co. reports a net profit of $299,339, equal to 72c a share on each of the common stock, for the fiscal year ended September 30, 1945, which compares with a net profit of $505,629 for the previous fiscal year.

The 1945 net profit is lower than that of the previous year, according to the report, because almost all government contracts were terminated shortly prior to the end of the present fiscal year and the board elected to write off $687,557, as of September 30, 1945 representing the entire amount of emergency war production facilities remaining unamortized on the company's books as of that date. Of this amount $91,067 applies to operations of the preceding fiscal year and $596,490 is applicable to the current fiscal year. The amount written off in the year reported had the effect of reducing the net profit.

Net sales for the fiscal year ended last September amounts to $10,683,258, a 57 per cent increase over the $6,805,669 reported for the 1944 period.

The report indicates that two affiliates, the Armstrong Tire & Rubber Co. and the Lake Shore Tire & Rubber Co., had net incomes of $123,163 and $108,814, respectively, for the same fiscal year, which compares with net profits of $365,-967 and $100,090, respectively, for the previous fiscal year. No dividends from any of its affiliated companies have been received by the parent company, with the exception of the 286 Hotel Corp. Hence, the company's interest in the net profits of the remaining affiliated companies has consisted of an increase in its share of their net worth.

A statement accompanying the report reveals than in April, 1945 a recapitalization plan was approved by stockholders, under which 4¾ per cent preferred stock was created and the authorized number of shares of Class A common stock, without par value, was increased from 400,000 to 750,000. Thereafter, a 300 per cent stock dividend was paid on the Class A and Class B common stock and the company sold 50,000 shares of preferred stock and 50,000 shares of Class A common stock. The net proceeds of the public financing, amounting to $3,153,037, were received in May.

The consolidated balance sheet as of September 30, 1945, indicates total current assets of $5,418,493, including $1,-065,048 in cash, $1,404,053 in U. S. government bonds and other government securities, and $1,528,282 in inventories. Total current liabilities are reported as $1,081,979, including $546,958 in accounts payable, $337,918 in accruals, $82,602 in dividends payable, $71,962 in current accounts of affiliates, and $42,539 in employees withholding tax.

Award Marietta Plant Contracts

Award of the contract for steel for the new plastics processing plant which the B. F. Goodrich Co. is building near Marietta, Ohio, to the Bethlehem Steel Co. has been announced by the company. At the same time H. E. Cook, chief engineer, revealed the key personnel who will direct construction of the plant. William B. Thompson is field engineer, with headquarters at the site, while G. M. Wood, field construction superintendent of the company's engineering division, will handle construction problems in the Akron offices. Work on field offices and warehouses is already under way.

Schedule Farm Exhibit

Evidence of what the farmer may expect in new and improved products for use in the field and in the farm home will be shown by the U. S. Rubber Co. at an exhibit to be held in Chicago at the Stevens Hotel on April 1 to 6, inclusive. The exhibit, to be held under the name of "Science Serves the Farm," is part of the company's broad agricultural program, and will emphasize the ever-widening use of rubber on the farm and its contribution to greater operating efficiency.

Ontario Group Sees Films

At a meeting of the Ontario Rubber Section of the Chemical Institute of Canada, held in the lecture room of the Physics Building of the University of Toronto, Canada, a feature film on rubber, several cartoons and a few movie shorts were shown to approximately 100 members and guests. The feature film, "Victory in Rubber," produced by the CPA Rubber Division, portrays the immensity and complexity of the war-built synthetic program. The film starts by showing how Japanese plans to capture and cut off the rubber producing areas from the rest of the world made this synthetic program necessary. The war-born program is then reviewed from the construction of the plants and acquisition of the equipment to the chemistry of the synthetic process, from the raw materials to the finished product. The tire testing program carried out by the U. S. Army with the co-operation of industry is also illustrated by scenes of the actual testing methods under all conditions at San Antonio, Texas.

Quebec Group Hears Keightley

Approximately 100 members and guests attending the meeting of the Quebec Rubber and Plastics Group, held at the Ritz-Carlton Hotel in Montreal on January 11, heard B. W. Keightley, advertising manager of Canadian Industries, Ltd., Montreal, deliver a talk on "The Use of Advertising in Helping to Creates Sales for New Products." Mr. Keightley asserted in his talk that although the public is ready and expects new products, advertisers have described the postwar potentialities of industry in too glowing terms. He warned manufacturers of new products to keep their advertisements within the bounds of known facts, or else the public's faith would be betrayed by hastily introduced goods that would fail to measure up to expectations. Mr. Keightley's talk was followed by a movie, entitled "Nylon."

Thiokol Club Holds Meeting

A well-attended meeting of the Thiokol Technical Club, with more than 40 guests in attendance, was held at the Thiokol plant in Trenton, N. J., on January 23. The speaker for the evening was H. L. Boulton, of the Dow Corning Corp., who discussed "Silicones—New Engineering Materials." In the course of his talk Mr. Boulton described the chemical nature of the silicones, briefly traced the history of silicone chemistry, and discussed the various types of silicone products now available, including the fluids, greases and compounds, resins and varnishes, and Silastic, the silicone rubber. Basic properties and major applications of these materials were emphasized. The speaker used both slides and samples to illustrate many points in his talk.

Depew Joins Flintkote Co.

Harlan A. Depew

Dr. Harlan A. Depew, manager of the fluoride titanium plant operated by the Sherwin-Williams Co. at Gloucester City, N. J., for the past few years, has joined the technical staff of the Flintkote Co. at East Rutherford, N. J., where he will be in charge of the rubber section of the research department. From 1932 to 1940 Dr. Depew was director of research for the American Zinc Sales Co. at Columbus, Ohio, and prior to that was chief of the rubber section of the New Jersey Zinc Co. at Palmerton, Pa. His business affiliations have also included work with the Firestone Tire & Rubber Co., the United States Chemical Warfare Service, and the United States Bureau of Mines. Dr. Depew is well known for his activities in the American Chemical Society and the American Society for Testing Materials, and has contributed many technical papers to the literature on rubber and pigments.

Acquires Franks Chemical Co.

The Witco Chemical Co. has acquired the Franks Chemical Products Co., of Brooklyn, N. Y., manufacturer of aluminum, barium, calcium, lead, magnesium, sodium and zinc stearates. No change will be made in the present management and Joseph M. Franks will continue as president. The company will be operated as the Franks Chemical Products Co. Division of Witco Chemical Co. Since acquisition by Witco, the plant capacity has been doubled to meet the requirements for stearates by industry.

Pequanoc Moves Boston Office

The Boston, Mass., office of the Pequanoc Rubber Co., manufacturer of reclaimed rubber at Butler, N. J., has been moved to 203 Park Square Building, 31 St. James Avenue. The office was previously located in the building but on another floor. H. P. Fuller continues in charge of the office.

Heel Plants on Block

Two heel and sole plants, one located in Canton and the other in Chelsea, Mass., both government-owned and constructed during the emergency period to meet both military and essential civilian demand, have been offered for sale by the Reconstruction Finance Corporation. The Canton plant is a one-story building of reinforced concrete with brick walls, located on a 4½ acre site. Equipment includes a No. 11 Banbury, mixers and a York refrigerator system. The Chelsea plant consists of a building 681 by 148 feet in size, built on concrete pile foundation, with steel frame, brick walls, and concrete floors, on a 2½ acre site. Equipment includes two Banburys, 11 mills, 7 hydraulic presses, 4 presses, 3 conveyors, and a dust collector system. The Canton plant was formerly operated by the Plymouth Rubber Co. The Chelsea plant was intended for operation by the Panther-Panco Rubber Co.

SAE to Reveal Nazi Secrets

Conversion of German automotive engineering data, techniques, and materials to the uses of American industry will be inaugurated at a German Engineering Evaluation Meeting by the Society of Automotive Engineers, Inc., scheduled for March 4 at the Rackham Educational Memorial, Detroit, Mich. The affair is sponsored by the SAE Passenger Car and Truck and Bus Engineering Group. Automotive engineers from American industry and the military will present technical papers describing German automotive progress. Among one of the papers scheduled to be read at the afternoon session is "Observations on the German Rubber Industry," by Earl W. Glen, of the Goodyear Tire & Rubber Co., Akron, Ohio, and newly appointed assistant director of the CPA Rubber Division.

G-E Forms Rubber Division

A Rubber and Printing Division was one of three new additions recently made to the Industrial Engineering Division of the General Electric Co., Schenectady, N. Y. The other two divisions cover Power Electronics and Materials Handling and Testing Equipment. The Rubber and Printing group, under the direction of G. W. Knapp, will handle rubber processing and all branches of the printing industry.

Factory Planned at Killbuck

A small rubber factory will be established at Killbuck, Ohio, by Maurice Chadwick and Frank Rice, who were associated with the Firestone Tire & Rubber Co., Akron, for over 15 years. Products the company expects to manufacture consist of washers, gaskets and other similar items. The concern will employ about 20 persons, and operations are scheduled to begin in March.

CANADIAN NEWS

The Canadian Reconstruction Minister, Mr. C. D. Howe, has announced adjustments in the prices of synthetic rubber sold by the Polymer Corporation. New prices became effective Feb. 1.

The price of GR-S (Buna S) was reduced from 21.24 cents to 20.85 cents a pound, delivered at the consumer's plant, while the price of GR-I (Butyl) was raised from 17.90 to 20.85 cents a pound. As sales of Buna S have been much greater than those of Butyl, the increased price for Butyl, will be substantially offset by the reduction in the Buna S price.

The Polymer plant, built at Sarnia, Ontario, to meet the war emergency, now is producing approximately 6,800,000 pounds of Buna S and 2,000,000 pounds of Butyl monthly. Mr. Howe said the plant "is standing on its own feet financially and is proving itself of inestimable value to our peacetime economy. It's future is assured."

The corporation also handles the sale of natural rubber, of which Canada is using about 1,500,000 pounds a month. Cost of natural rubber is about 45½ cents a pound, but its sale is subsidized by the Prices Stabilization Corporation and the net selling price is approximately 24.5 cents a pound.

The Reconstruction Minister explained that the subsidy is not applied directly to the natural rubber, but the corporation receives 2.9 cents a pound on all rubber it sells, including synthetic rubber, "but it must be emphasized that the synthetic rubber production now requires and receives no subsidy."

Seiberling Rubber Company of Canada reports that net profit for the 14 months ended December 31, 1945, before provision for taxes, was $68,383. Net profit for the period after all charges, including provision for depreciation and for taxes on income, was $41,183, compared to a net profit of $52,079 for the year ended October 31, 1944 (after giving effect to the adjustments made through surplus account in 1945).

M. L. Brown, president, said: "The reduction in profit for 1945, as compared with 1944, is due chiefly to two factors, first, the greatly increased charge in 1945 for special depreciation of capital assets acquired for war production, and the varied difficulties of conversion from wartime to peacetime operation.

"All of the special depreciation permitted by the War Contracts Depreciation Board has now been absorbed, and depreciation charges for future years on existing assets will be greatly reduced. The directors feel that the difficulties of conversion have been overcome largely, and that their adverse effect will be a diminishing factor in 1946."

The excess of current assets over current liabilities was $904,784, compared with $950,783 at October 31, 1944 (after giving effect to the adjustments made through surplus account in 1945). This represents a decrease of only $46,000 during the 1945 fiscal period when approximately $253,000 was expended for additional capital assets and funds were paid or provided for bond redemption ($40,000) and for dividends ($15,657).

Two large companies are spending $5,000,000 in additions and alterations to their Kitchener plants—the B. F. Goodrich Company with a $1,000,000 addition and the Dominion Rubber Company with a $4,000,000 expansion program.

Kitchener's first rubber products plant (footwear) was opened in 1899 as the Berlin Rubber Co. by George Schlee, Jacob Kaufman, A. L. Breithaupt and Louis Weber. Not many years later, Kaufman organized the Merchants' Rubber Co. and built a much larger rubber footwear plant which was sold in 1906 to Dominion Rubber Co., the present owner.

Berlin became a city in 1912, in which year Dominion Rubber built its automobile tire plant. Goodrich came in 1922.

William Funston, president and general manager of the Firestone Tire & Rubber Co. of Canada, recently stated that a conservative estimate of the number of tires needed to fill requirements of all motorists in Canada was 1,000,000. George Davis, president of the Hamilton Garage Operators' Association, predicted that only motorists whose tires were unsafe would get first supplies. "Experience with other articles, such as gasoline," he pointed out, "has shown that demand drops rather than increases as soon as the public knows the articles are no longer rationed and may be bought freely."

New rayon cords of high tensile strengths are being developed and will be made available within the next few years, said F. C. Kennedy, a member of the Tire Cord Development Division of the U. S. Rubber Co., at the second annual Dominion Tire Development Conference held recently at the Dominion Tire Factory in Kitchener, Ontario. Mr. Kennedy stated that under normal price conditions the use of cotton for tires might be entirely replaced by rayon. The development of rayon cord for use in both passenger and heavy service tires is only in its infancy, he pointed out, and newer cords improved in resistance to breakdown by heat generated in fast-moving tires are being developed.

Kok-saghyz, being grown in Toronto beds, produces better rubber than Malaya plantations in 75 per cent of commercial uses, recently asserted Prof. George H. Duff of the University of Toronto. Its chief drawback seems to be in the manufacture of tires, for which it is too soft. The Toronto beds were started when Russian scientists shipped a handful of kok-saghyz seeds to Canada, where the climate needed for its growth has proven ideal. Prof. A. I. Kupssav, of Komsk University, Russia, recently stated that the Canadian climate is even better than that of Russia.

Several changes in its sales staff have been announced by the Firestone Tire & Rubber Company of Canada, Ltd. S. S. Tobias, formerly manager of the London and Toronto branches of the company, has been promoted to sales manager; E. H. Snider, formerly supervisor of war contracts, has been appointed manager of manufacturers' sales; and Stephen F. Palmer, associated with the war products division during the war, has been made manager of truck, bus and tractor tire sales.

The Wartime Prices and Trade Board has announced the lifting of restrictions on the distribution of tire reliners and patches, but price controls remain in effect. The restrictions were lifted because supplies of reliners and patches has improved with the end of rationing of new tires.

W. C. Botkin, formerly control manager of the U. S. Rubber Co. ordnance plants at Milwaukee, Wisc., and Des Moines, Iowa, and prior to that control manager of the tire plant of the U. S. Rubber Co. in Los Angeles, Calif., has been appointed treasurer of the Dominion Rubber Co., Ltd., Montreal.

James Brown, Quebec representative of the Gutta Percha and Rubber, Ltd., died at his home in Quebec on January 25.

Introduce Nevillac TS

Nevillac TS, a new plasticizing resin having very little odor and good color retention, has been introduced by the Neville Co., Pittsburgh, 25, Penna. A clear amber, resinous oil with a vague phenol odor, the new resin is very viscous and slow flowing. It is soluble in practically all solvents except water, glycerine and higher polyhydric alcohols, and miscible with ethylene glycol and its di- and tri-derivatives. It is compatible with synthetic rubbers, zein, cellulose derivatives, terpene, alkyd, phenolic, vinyl and coumarone-indene resins. Nevillac TS has an average molecular weight of 250 and a specific gravity of approximately 1.08. Distillation is essentially above 300° C. with slow decomposition beginning at at about 370° C. Suggested uses for the new product are as a plasticizer, softener, impregnant, and for waterproof and grease proof paper coatings.

LOS ANGELES NEWS

The largest number of people ever attending a supper program meeting of the Los Angeles Rubber Group, Inc., since its organization was present at the February gathering, sponsored by Firestone, at the Mayfair Hotel, Tuesday evening, February 5. The number in attendance was 248. The technical meeting held immediately before the supper meeting in the same room also had its largest attendance to date—150.

The main address of the evening was given by Brownie Carslake, head of the Firestone racing department. Mr. Carslake, who was born in Australia, came to America 35 years ago. For more than 40 years he has been connected with automobile racing, motorcycle racing and bicycle racing. Due to an injury received many years ago he had to retire from active participation in racing himself but he never lost interest in the sport and for a quarter of a century has headed up the department he now heads. He has attended practically every important race at Indianapolis and elsewhere and is regarded as a prime authority on this sport.

Mr. Carslake's address was in the nature of an inspirational talk, a eulogy on the great figures in racing history, particularly those winning national championships at the Indianapolis Speedway. He complimented the heroes of the track in glowing terms, his thought being well summarized in his own words: "The men and boys who race at Indianapolis are not dare devils with no regard for their own lives, they are as a rule skilled engineers. There are numberless improvements in automobiles now used by all which had their origin at Indianapolis." He mentioned a number of these and gave the history of their origin. The theme of his talk was, "Romance and Drama of the Indianapolis Races."

Another feature of the evening's program was the showing of a moving picture, "Your America," a picture showing the evolution of the thinking of a soldier from the time of his entry into the army until his discharge, a growing appreciation of America as an ideal for which to live and fight. Yet another feature was music by Jose Aria's 4-piece Latin American orchestra.

Four prizes were offered, a door prize and two special prizes. A Firestone tire was won by Don Boyd, an electric flatiron was won by Carl E. Stentz, and pictures with mirror frames by L. O. Smith and Herb Graley.

Curtis Wolter presided as general chairman of the evening, taking the place of the regular chairman, Miles Reinke, who was absent in New York City. R. E. Hutchinson acted as program chairman, while Leonard Firestone introduced the speaker of the evening after being introduced by Clyde L. Smith.

The technical meeting was addressed by V. L. Smithers, president of V. L. Smithers Laboratories. Mr. Smithers through his laboratory furnishes to the industry a complete tire and battery analysis service. He took as his subject, "Vulcanization and High-Frequency Heating." Elliot McLaughlin, of Goodrich, presided.

Bob Abbott, of the C. P. Hall Company, has sold his home in San Marino and is building a new home on a 4-acre orange and avocado ranch that he has purchased in Covina Highlands, east of Los Angeles. He is very happy about the deal and is looking forward to the return of his son, Bob, Jr., who still is serving in the navy.

The C. P. Hall Company recently added two new salesmen, both returned servicemen, one for the northern California territory and one for the southern area. The former is Chick Sherman and the latter is Albert Federica.

Herman Libkind has recently been named assistant works manager for Western Insulated Wire Company.

F. H. Banbury, of the Farrel-Birmingham Company, is again spending the winter in Los Angeles and is making his home at the Ambassador Hotel.

Ralph Hickcox has arrived from Akron to take over the job of manager of plastic sales for Goodyear in the Los Angeles area. He was connected with a similar department at Akron.

F. A. Bonstedt and L. J. Venuto, of the Binney and Smith Co., were in Los Angeles for some time in January and showed movies dealing with furnace type carbon blacks to members of the Los Angeles rubber industry who were on each of five nights supper guests of Binney and Smith at the Jonathan Club. The two men were in town about ten days.

Carl E. Stentz reports that the plant of Latex Seamless Products, which he owns, is at the present time in the process of being tripled in size.

Frank Shew, well known in rubber industry circles of Southern California, has returned from Bogota, Colombia, where he spent two years in the employ of the government with the Rubber Development Corporation. Prior to that time he spent a year in Washington, D. C., where he was connected with the War Production Board. He is not certain at present whether he will remain in the Los Angeles area or return to Colombia.

H. L. Alden

who was recently named branch manager of the new Schulman plant at Long Beach, California.

Miles Reinke, chairman of the Los Angeles Rubber Group, Inc., spent several days in New York and other points east during the last month in the interests of his company, Reinke and Amende, Inc.

Fifteen U.S.C. technical students accompanied by their professor attended the February meeting of the Los Angeles Rubber Group. Prior to that they had spent half a day going through one of the large rubber plants of the city.

H. F. Parkerton, Sr., of the Farrel-Birmingham Co., Inc., is recovering from injuries received in a recent automobile accident.

T. Kirk Hill has disposed of the Arrowhead Rubber Company of Texas located at Dallas. He had operated the plant during the war years.

George Pieretti, proprietor of the Pieretti Machine Company, well known among rubber men in southern California, was killed in an automobile accident during the recent holiday season.

Revertex Moves Offices

Revertex Corporation of America, manufacturers of Revertex concentrated latices, has moved its offices to 274 Ten Eyck St., Brooklyn 6, N. Y. The telephone number is EVergreen 7-9416.

OBITUARIES

Philip H. Ober

Philip H. Ober, senior vice-president and a member of the board of directors of the Mansfield Tire & Rubber Co., Mansfield, Ohio, died at his home in Mansfield on February 1, at the age of 79, from complications which resulted from hip and shoulder fractures suffered in a fall more than a year ago. Mr. Ober, who would have been 80 next July, was a veteran of 49 years in the rubber industry, 30 of them with the Mansfield firm.

Born in Baltimore, Maryland, in 1866, Mr. Ober began his career in the rubber industry with the former Hartford Rubber Co. in Hartford, Conn., in 1897. Later, he was associated with the Dunlop Tire & Rubber Goods Co., Toronto, Canada, the Fisk Rubber Corp. in Chicopee Falls, Mass., and the Federal Rubber Co., Milwaukee, Wisc. He joined Mansfield Tire in 1916 as factory manager and became vice-president and assistant general manager in 1923. It was while serving with Federal Rubber in 1912 that he first became acquainted with G. W. Stephens, now president and general manager of the Mansfield concern.

Long active in civic and sporting circles, Mr. Ober was affiliated with various Masonic organizations, including the Mansfield Chapter. He was a member of the Mansfield Chamber of Commerce and the Central Methodist Church. Funeral services were held on February 4. A widow survives.

Robert M. Pillmore

Robert M. Pillmore, one of the original and oldest surviving incorporators of the Mohawk Rubber Co., died on January 12 in People's Hospital, Akron, Ohio. The fact that he was born in New York's Mohawk River Valley was responsible for naming the company, with which he served as inactive president. Born in Westernville, N. Y., he came to Akron as a young man and, in the 50 years he lived there, became one of the city's business leaders. A niece survives.

Abraham Radetzky

Abraham Radetzky, president and founder of the Gotham Aseptic Laboratory Co., Long Island City, N. Y., manufacturers of adhesive tape and drug specialties, died on December 4 at the age of 61. Mr. Radetzky was considered a leading packaging expert of surgical dressings and was one of the first manufacturers to design his product to suit the requirements of the syndicate store field.

Walter Gussenhoven

Walter Gussenhoven, formerly general manager of the mechanical goods division of the U. S. Rubber Co., died at his home in Ridgewood, N. J., on January 21, after a lingering illness. He had been associated with the rubber company for 47 years, going on leave of absence in August, 1944, when his health began to fail. He was 68 years old. Born in Laramie, Wyoming, Mr. Gussenhoven began his career with U. S. Rubber in 1899 as a tire salesman in New York. In 1913 he went to Chicago as a mechanical goods salesman and three years later he was made branch manager in Chicago. In subsequent years he was given additional responsibilities, climaxed in 1927 with his appointment as general manager of the company's mechanical goods division. A widow and son survive.

David Feinburg

David Feinburg, president of the David Feinburg Co., dealers in scrap rubber at Medford, Mass., died on January 12 at his home in Boston. Mr. Feinburg was one of the youngest men to attend the organization meeting of the National Association of Waste Material Dealers, Inc., which was held in Boston on March 24, 1913. In March 1942, after serving the Association as a director for many years, he was unanimously elected to the presidency of the organization. Mr. Feinburg opened his own concern in Chelsea, Mass., and then moved it to the present location of the company in Medford.

Julius Loeb

Julius Loeb, chairman of the board of the Universal Products Corp., Morristown, N. J., and retired vice-president of the American Metal Co., Ltd., died at his home in New York City on January 4 at the age of 72. Born in Germany, Mr. Loeb came to the United States in 1890 and joined the metal organization, retiring in 1930 to devote himself to various philanthropies, particularly the Hebrew Orphan Asylum. He was a Past Master of King Solomon's Lodge of the Masons and a member of the Harmonie and North Shore Country Clubs. A widow, son and daughter survive.

New Activator for GR-S

The development of "Bunac," a new activator for GR-S, has been announced by the Wilmington Chemical Corp., 10 E. 40th St., New York 16, N. Y. The new activator is said to improve cut-growth resistance without increased heat build-up.

Duorite Develops Duroflex

Duroflex is the trade name of a new synthetic rubber-like mold material developed by the Duorite Plastic Industries, Culver City, Calif. It is a thermoplastic which is used to make molds for the casting of plastics, plaster and allied materials, and partly eliminates the need for "piece molds" because it is stretchable. The latter feature makes it possible to remove casts which have undercuts and back drafts from single unit Duroflex molds. The material is melted in a double boiler, whose outer container has an oil bath to prevent overheating It can be poured after it attains a temperature of 300° F. No parting agent is required to separate the Duroflex mold from either its model or subsequent casts, and the hardening time of the material varies in accordance with its mass. A comparatively small mass hardens in about 20 minutes.

Resin Plant Nears Completion

The resin plant under construction by the National Atlantic Research Corp. in Wilmington, Del., is rapidly nearing completion. It has been learned that the plant will be operated by the Delaware Resin Chemicals Corp., a newly formed organization, whose officers are Gordon Urquhart, president; Anton Bresterbreurtje, vice-president and treasurer; F. C. Atwood, vice-president in charge of development, and Edwin S. Dwelly, vice-president. Mr. Urquhart and Mr. Bresterbreurtje are also president and vice-president, respectively, of the Wilmington Chemical Corp., and Mr. Atwood and Mr. Dwelly are president and executive vice-president, respectively, of the National Atlantic Research Corp.

Cabot Increases Tank Car Fleet

To handle the expected increase in the use of carbon black in bulk by manufacturers, Godfrey L. Cabot, Inc., Boston, Mass., has announced that it will add 20 new tank cars to its existing CABX fleet of 86 cars during the second quarter of this year. The Cabot company pioneered in the tank car field in June, 1933, when it designed and introduced the first car for bulk shipment of Spheron carbon black from its plants direct to tire factories.

Advance Opens New Office

Advance Solvents & Chemical Corp. has opened a new office at 505 Society for Savings Building, Cleveland 14, Ohio, to serve the territory comprising Western New York, Western Pennsylvania, Ohio, Kentucky, and Eastern Indiana. The new office, under the direction of Norman G. Schabel, recently discharged from the Army, will handle all company activities in connection with the promotion and distribution of rubber specialties, paint and varnish.

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Synthetic Resins

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NEW EQUIPMENT

Precision Scientific Titrometer

A new titrometer, which accurately determines the free and combined acidity of material in either aqueous or non-aqueous high-colored or opaque solutions, thus replacing color indicators, is now being offered by the

Precision Scientific Co., 1750 North Springfield Ave., Chicago 47, Ill. The instrument was originated by the Shell Development Laboratories primarily for determining the acidity of highly complex mixtures of lubricating oils, either completely opaque or so dark in color that the routine acidimetric color titrations could not be made. However, the titrometer has been found applicable to determine the acidity of used lubricants, detergents, fats, turbine oils, oil additives, motor oil sludges, asphaltenes, crude oils, asphalt, asphalt residues, distillates, distillate bottoms, polymers, rubber, vegetable and animal oils, fats, waxes, greases, common solvents and other water solutions. The potentiometer method is reliable and reproducible, and the titration media is capable of dispersing or dissolving sufficient quantities of the water insoluble materials under test.

The operation is similar to that of the pH determination. The instrument has two complete titration stands. The alternating current operated electrometer allows the use of any electrode system in aqueous or non-aqueous solutions. The calomel-glass electrode is readable to within 0.02 pH units. The titrometer is equipped with meter scales and potentiometer circuits which give a range of — 1.65 to + 1.65 volts readable to 0.5 millivolts. The use of sturdy glass electrodes and high resistance titration media in conjunction with a versatile potentiometer capable of measuring the potential between the electrode terminals of the cell having a resistance up to 5000 megohms insures the long life and accuracy of the instrument.

The step potentiometer is used in conjunction with the vacuum tube electrometer making the instrument continuously indicating, which requires less manipulation by the operator and enables easy and definite indication when the potential reaches equilibrium. The step potentiometer gives wide range and high sensitivity in a single indicating meter and can be used for routine or special determination No prior knowledge of the magnitude or sign of the potential is necessary

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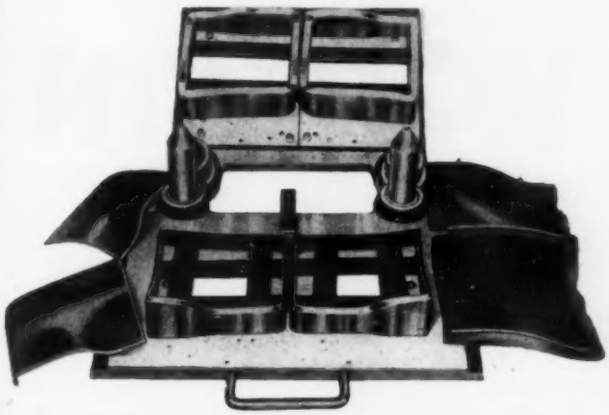

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Tackifier for GR-S

Koresin, t-butyl phenol-acetylene condensate, is available from pilot plant production. It is highly regarded as a tackifier for Buna-S and has been suggested for use in varnishes.

GENERAL PROPERTIES:

Melting Range: 115-130°C.

Color: Tan-Brown.

Soluble in: Hydrocarbons, drying oils, ketones, esters, sec-butanol.

Compatible with: GR-S, oil soluble phenolics, coumarone-indene resins, polyvinyl butyral, polyvinyl chloride, methyl methacrylate, ethyl cellulose.

Available in 350-pound Fiberpaks.

Inquiries from rubber fabricators, manufacturers of paints and varnishes, and others are welcomed.

For information and samples of this synthetic resin, write:

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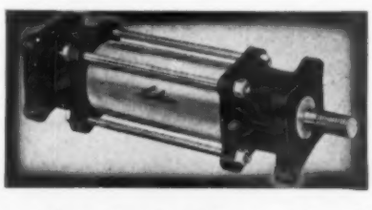
as the electrical characteristics of the circuit and meter allow measurement of the system's potential without the danger of polarizing the electrode system. Two titrations can proceed simultaneously owing to the dual feature of the system; and the two diverse electrode systems may be left permanently set up.

The titrometer is portable, has a power consumption of ten watts and is suitable for continuous duty. The entire electronic system is shielded and enclosed in a metal housing. No batteries or transformers are required. It has a plus or minus charge of ten volts in a 115 volt AC line, which will result in a DC voltage change of only ± 0.1 per cent. When determining the acidity in complex mixtures the titrometer is also an aid in identifying the acidic constituents of the mixture, and in addition, it furnishes a record of possible changes taking place during sample analyses.

New Standardized Cylinder

A marked advance in design and construction of cylinders is announced by the Engineering Products Company, Los Angeles, California. Cylinders in the past have been built in a number of types, models, sizes, and an infinite variety of lengths.



For the first time in the history of cylinder construction, a standardized cylinder has been produced for operation by air, oil, or water, which lends itself to almost universal mounting applications. At the same time, the cylinder is completely standardized, is manufactured in quantities, and is available off the shelf in an assortment of diameters and stroke lengths that meet practically all requirements.

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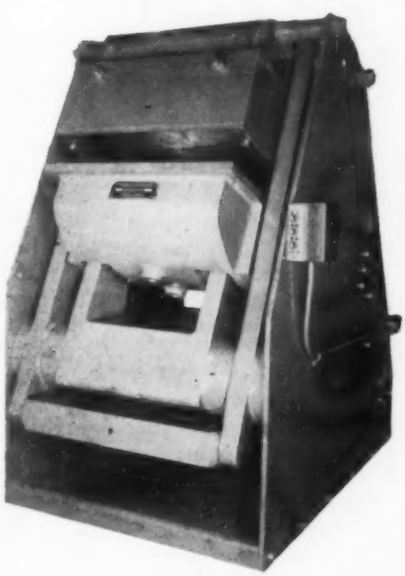

For mechanical rubber and plastic articles. Combination oil hydraulic and toggles with platen pressure of 200 tons. Platens 34" x 34" with daylight opening 14½". May be adjusted for slight variation of mold thickness. Simple in construction and easy to lubricate and maintain. Easily controlled.

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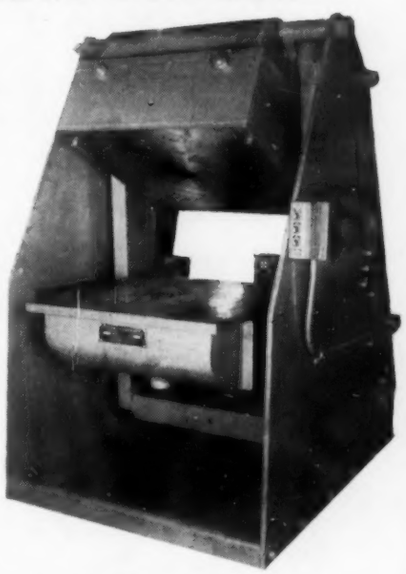

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HIGH BOILING AROMATICS

RUBBER PLASTICIZERS

"639½"

Comparison with Ten Competitive Softeners Using 10 Parts/100 GRS in a Typical Tread Stock.

SHOWS:

Lowest Mooney Plasticity

High Original Tensiles and Elongations

Good Tear

Satisfactory Aging—Bomb, Oven and Sunlight

Reduced Blistering*

Low Compression Set

Normal Shrinkage

Relative Freedom from Staining

Flexing Equal to Pine Tar

*Volatility of "639½" is low—typical flash point 515° F.

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STANDARD OIL COMPANY
(INDIANA)

CHEMICAL PRODUCTS DEPARTMENT

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Jeffrey BD Shredding Machine

Especially designed for use in the manufacture of synthetic rubber and rubber-like materials, the BD Jeffrey Shredder is currently being marketed by the Jeffrey Manufacturing Co., Columbus 16, Ohio. The

shredder takes the crude rubber directly from the coagulator or a filter and shreds it into porous pellets, thus producing an ideal product for drying operations. It not only tears and cuts the rubber into small porous pellets to facilitate drying, but permits the injection of water or chemical solutions in the machine, along with the rubber, for washing, or neutralizing the solution used for coagulation. The unit is applicable both as a primary unit directly following the coagulator or a filter, and as a secondary unit immediately ahead of the dryer after part of the moisture has been removed. Specially designed chisel point shredding elements are securely anchored in a rotor which revolves at high speed over specially designed cutting bars located in the lower chamber. These bars are properly spaced to produce a product of a size most effective for drying operations. The frame is of heavy rigid cast iron with vertical type hinged breaker-plate and is equipped with renewable liners. A hinged door is provided in the back for easy access to the interior of the machine without disturbing the hopper or discharge chute. The accompanying illustration shows a cross-sectional view of the shredder indicating the method of reduction.

A new slide rule which is said to solve the perplexing problem of decimal point location was recently developed by Pickett & Eckel, 53 West Jackson Boulevard, Chicago 4, Ill. Called the **Deci. Point Slide Rule,** it not only places the decimal point "mechanically" for the result, but for the square root, cube root and logarithm of the result, which are all obtained at the same time.

American Instrument Co., Silver Spring, Maryland, has introduced a new **laboratory stirrer-type superpressure assembly** which has a capacity of 845, 1410, 2960 or 1780 ml. for operation at pressures up to 10,000 lbs./sq. in. and at temperatures up to 750°F. Other sizes are also available.

New Stock Cooling Rack

THIS New Rack offers a convenient method for storing materials that require cooling or air drying.

- Rack can be either stationary or mounted on casters.
- Trays have perforated metal surface and can be spaced to suit.
- Standard Rack has eighteen trays 36" x 36" spaced 2⅝" apart.

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IN
LATEX COMPOUNDS
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LATEX ADHESIVES
WITH
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We PROCESS LINERS of All Types ★

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We also manufacture Mold Lubricants for use with synthetic as well as natural rubber.

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WATER-PROOF

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TO COMPOUND FOR

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RAYCO *Flock*

The problem of marking can be successfully minimized by introducing Rayco Flock into sole compounds, whether using crude, synthetic or reclaim stocks. At the same time, considerable increases can be obtained in abrasion and tear resistance. In the selection of the flock filler that is EXACTLY RIGHT for each compound, our technical men work with yours wholeheartedly and competently.

ENGINEERING DATA AND WORKING SAMPLES UPON REQUEST

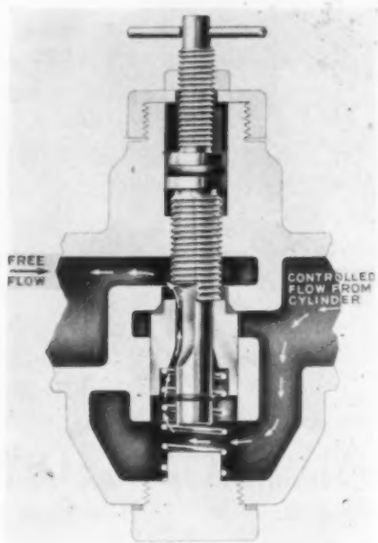
RAYON PROCESSING CO. of R.I. INC.

100 TREMONT ST., CENTRAL FALLS, RHODE ISLAND

Developers and Producers of Cotton Fillers for Plastics

Ross Speed Control Valve

To provide an unlimited range of selectivity in the volume of air, thereby giving split-second control of the piston speed, is the purpose of the Ross Speed Control Valve, recently announced by the Ross Operating Valve Co., 6453 Epworth Blvd., Detroit 10, Mich. The flow



of air from the cylinder to the operating valve is regulated with absolute precision, and in either small volume or large volume, with changes taking place with smooth progression, rather than a series of "steps." As shown by the cut-away view, both the principle and construction are very simple. There are but two moving parts —stem and poppet—with the stem so shaped as to form a venturi for the passage of air in small volume. As the threaded stem is turned downward from a closed position, incoming air in small volume is allowed to pass through the venturi into the outlet passage, increasing in volume as the stem is lowered. Continued turning of the stem causes a flange on the stem to open the poppet, permitting further increase in volume to full flow. Return air is at full flow.

Servotron Variable Speed Drive

A new variable speed drive, under the name of Servotron, in which speed is controlled electronically, was recently introduced by the Submarine Signal Co., 160 State St., Boston 9, Mass. The new drive operates on alternating current and through an electronic controller runs a direct current motor at speeds which are infinitely variable within the motor's speed and load capacity. It maintains uniform torque over the entire speed range. The drive eliminates the laborious and time-consuming changing of gears formerly encountered in mechanical drive systems. The Servotron will also have instantaneous dynamic braking and instant reversal without speed overrun. Within the coming year it is expected that a complete line of drives from 1/50 h.p. to 5 h.p. will be available. Larger units are also being developed.

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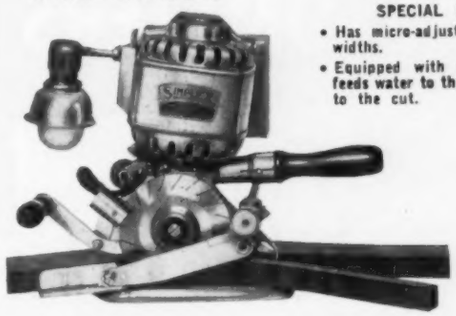
RUBBER STRIP CUTTER

PATENTED

A PORTABLE machine capable of stripping slab rubber up to 1″ thick at the rate of 20,000 feet in 8 hours. Any width desired.



SPECIAL FEATURES

- Has micro-adjustment for accurate widths.
- Equipped with water tank which feeds water to the slotted knife and to the cut.
- Has repulsion-induction motor which carries any overloads.
- Automatic sharpener device keeps knife keen and sharp.
- Has base with rollers and is very easy to handle.

Cuts within 1/64 inch to 1/100 inch tolerance depending on grades of rubber. Cuts a slab down to the last shaving. Cuts all grades of rubber including pure gum, sponge, etc. Cuts squarely—no rejects.

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— for WEATHERING and FADING with

ATLAS-OMETERS

Twin-Arc WEATHER-OMETER

Tests Results Twice As Fast

The new Atlas Twin-Arc Weather-Ometer has been developed to save time where speed in testing is essential.

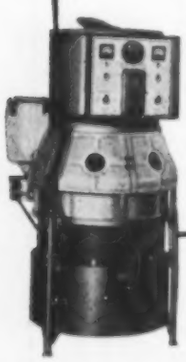
Where Federal Specifications call for a definite number of testing hours in the Atlas single arc Weather-Ometer, this time can be cut in half in the Atlas Twin-Arc.

Exclusive Atlas Twin-Arc Weather-Ometer features:

1. Temperature control.
2. Unlimited range and control of Light and Water Spray Periods.
3. Adjustable and automatic timing.
4. Insulated test chamber.
5. Operates continuously 24 hours without manual attention.
6. Carbon cost 28c per day.
7. Full automatic—Safe to operate unattended overnight.
8. Control panel contains Volt and Ammeters — Time Meter—Light and Water Cycle switch—Automatic time cut off switch — Voltage adjusting switch — Direct reading thermal regulator — Reactance Coil (cut power cost in half).

The Single Arc Model is a popular machine where high speed is not required.

FADE-OMETER



The recognized standard machine of the textile trade for determining the light-fastness of materials. Specimens are rotated around the Atlas Enclosed Violet Carbon Arc—the closest approach to natural sunlight. Temperature of the filtered air is automatically controlled. Proper humidity is furnished by evaporation from a constant-level water reservoir. Available with a wide variety of specimen holders and exposure masks.

• Originators and sole manufacturers of accelerated testing devices for a quarter of a century. Fade-Ometer, Weather-Ometer, Launder-Ometer are used all over the world as accepted standard testing machines.

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361 West Superior Street, Chicago 10, Illinois

REVIEWS

BOOKS

Evaluation of Effects of Torsional Vibration. Published by the Society of Automotive Engineers, Inc., 29 West 39th St., New York 18, N. Y. 8½ x 11 in. 576 pp. $5.00 to S.A.E. members; $10.00 to non-members.

Prepared in response to a request from the U. S. Navy, and now released with Navy permission, this special report is the most valuable fundamental treatise on torsional vibration problems issued to date. It presents the experimental and analytical methods used by research departments of a number of leading diesel engine manufacturers in investigating and applying means of controlling torsional vibrations.

Besides the introduction, which sets the problems, and conclusions, the bulk of the book consists of the technical treatises which discuss experimental methods used measuring torsional vibration, methods for determining and estimating the significance of nominal torsional stresses, and means for reducing those stresses. The characteristics of well known and conventional torsional vibration measuring equipment are discussed and compared and, in addition, unique types of torsiographs and torsiograph calibrators are described and illustrated.

Much attention has been given to various short-cut methods that industry has found usable for calculating natural frequencies and for rapidly determining those frequencies experimentally by the use of electrical and mechanical analogies. The distributed mass method of frequency calculation is explained. The increasingly popular experimental procedure of fatigue testing of full scale parts is explained fully by several companies, with diagrams and photographs of fatigue equipment developed by those companies being included.

The appendix contains, among other material, suggested specifications for torsional vibration equipment which will be of interest to all concerned with the manufacture and use of these instruments. References to the role played by rubber vibration dampers appear throughout the text.

•

World Rubber and Its Regulation. By K. E. Knorr. Published by Stanford University Press, Stanford University, California. 6 x 9 in. 265 pp. $3.00.

This book is a product of a research program on international commodity agreements conducted by the Food Research Institute of Stanford University. The Institute was forced to look beyond food products for pertinent examples of commodity control, and rubber naturally fell beneath its microscope. The book traces the growth of the natural rubber industry, its welfare between two wars, and the rise of the synthetic rubber industry. Particular emphasis is, of course, placed on the International Rubber Regulation Agreement and other attempts to "control" the market. The author presents a significant survey of rubber economy in the years to come, the competition of natural and synthetic rubber, their sources and markets, and the possibilities of development of new uses and other alternatives for consuming the rubber output. How the United States may be protected against future attempts at internaional control, how large a rubber stockpile should be accumulated, how far, if at all, synthetic rubber plants should be or need be subsidized to keep functioning are among the subjects discussed. Since a national rubber policy for the United States is currently pending, this book is most timely.

COLITE CONCENTRATE

A HIGH QUALITY CONCENTRATED LIQUID MOLD AND MANDREL LUBRICANT— *NON-TOXIC, NON-TACKY, ODORLESS.*

- *Simplifies the removal of cured rubber from the molds.*
- *Results in a transparent satin-like finish.*
- *Does not build up on the molds.*
- *Extremely concentrated and low in cost.*

A Direct Source for Zinc and other Metallic Stearates.

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Improved Type!

Attrition Mills for grinding all types of material. Adjustable for coarse or fine grinds. Hard iron grinding plates. Capacities to your requirements. Robinson Processing Equipment is designed by engineers whose reputation is founded upon doing things right. Literature available. Inquiries invited.

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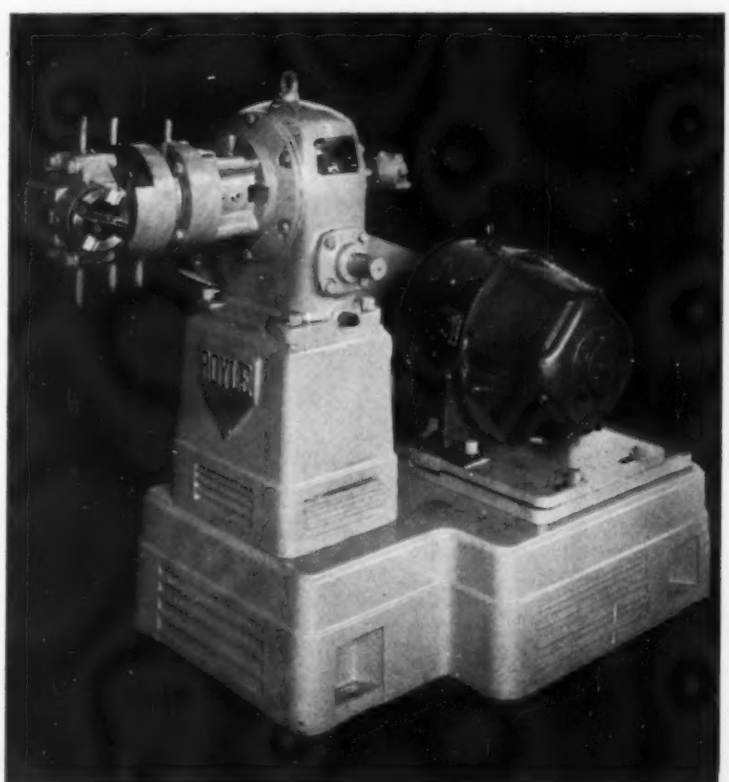

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Designed for Experimental and Product Extruding

Rugged is the word to describe this compact and highly efficient Royle continuous extruding machine. It embraces all of the characteristics required for larger and heavier extruding processes.

Primarily designed to become an integral part of laboratory equipment —the technician can be sure that his experiments will have a true relation to actual product extruding —the Royle #1 is an efficient producer of such commercial products as tubes, fine wire insulation, monofilament, and thread coating.

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SYNTHETIC RUBBER
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PLASTICS

THE Schuster
MAGNETIC CALENDER GAUGE
SAVES THAT MATERIAL

For upwards of 15 years, the Schuster Magnetic Calender Gauge has unerringly set rubber calender rolls to a predetermined thickness and correctly maintained that thickness. It has saved the time of handmiking, eliminated human error, saved the stock sampled for calender tests, and assured uniform thickness in the finished product.

All this, *at the right time — before* damage is done. And *continuously* — the only way worth while.

The instrument is simple in design . . . rugged in construction . . . practically without wearing parts . . . adjustable to any thickness. Originally used for rubber, it has taken over just as deftly for synthetic rubber, plastics, cellulose, and other media. No matter what the article, your coating must be thick enough, but not even 1/1000″ too thick, or the war effort suffers irreparable loss. No matter what the material, you've got to s-t-r-e-t-c-h it as far as possible — and "possible" daily proves to have a new, elastic meaning.

Better investigate the Schuster Magnetic Calender Gauge at once, with or without automatic control. Every installation has to be engineered to the job . . . Please *give us time to do it right.*

Ask for our bulletin on the Schuster Magnetic Gauge.

THE MAGNETIC GAUGE COMPANY
60 EAST BARTGES STREET AKRON, OHIO
Eastern States Representative—
BLACK ROCK MANUFACTURING CO. Bridgeport, Conn.

Plastics Mold Engineering. By J. H. DuBois and W. I. Pribble. Published by the American Technical Society, Drexel Ave. at 58th St., Chicago 37, Ill. 5½ x 8¼ in. 494 pp. $7.00.

Although numerous books on the subject of plastics and plastics technology have appeared in the past few years, few of them devoted more than a chapter or two to developments in the design and construction of molds, despite the fact that progress in the molding of plastics is dependent on such molds. It was evident, therefore, that there was need for a book describing the design of the important types of molds and indicating their use. This is the book.

Designed to be particularly helpful to those who are just entering the plastics field and wish to make a serious study of the numerous phases of the subject of molds, the book explains those construction methods most commonly employed, since best results are obtained when molds are designed for toolroom equipment that is widely available. Whenever the text deals wtih individual types of molds and specific molding processes, the procedures and calculations used in achieving the final mold design are indicated. Raw materials and product design considerations of large interest to the mold designer are discussed at appropriate length.

The book is divided into eleven sections, as follows: Plastics Molding, Plastics Product Design, Types of Molds, Tool-Making Equipment and Methods, Materials for Mold Making, Designing and Drafting Practice, Compression Molds, Transfer Molds, Injection Molds, Cold-Mold and Extrusion Die Design, Special Fixtures, and Mold Sampling and Maintenance. In addition, an appendix includes numerous tables designed to serve as a guide for the designer in collecting and organizing his own shop data.

•

Raw Materials from the Sea. By E. F. Armstrong and L. Mackenzie Miall. Published by Constructive Publications, Ltd., 213 London Road, Leicester, England. 5½ x 8¼ in. 164 pp. 15 shillings.

For millions of years the sea has been receiving vast quantities of substances washed down by innumerable rivers. Today we extract salt, bromine, magnesium, and other materials from the sea. How these substances came to be formed and how modern science is making them available for the use of man is explained in this book. The biochemistry of the sea is discussed and the effect of salinity, temperature, light and food on marine creatures is dealt with in simple, non-technical language.

FOR HIGH RESILIENCE, USE PHILBLACK A

(FOR FURTHER DETAILS, SEE AD ON PAGE 522)

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RUBBER-FLO
MOLD LUBRICANT

An *entirely new* and *different product*

Keeps molds cleaner longer—Gives greater lustre to finished parts. Send for a Free sample and compare it in your own way. Many large companies are obtaining phenomenal results, and are using it *exclusively*.

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Softens Rubber—cured and uncured. Salvage metal from rejects. Cleans screens, valves, molds, and has many other uses.

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1,800,000 Shares

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Common Stock
Par Value $1 Per Share

Price $20.25 per Share

Copies of the Prospectus may be obtained from only such of the undersigned as may legally offer these Securities in compliance with the securities laws of the respective States.

Otis & Co.
(Incorporated)

First California Company

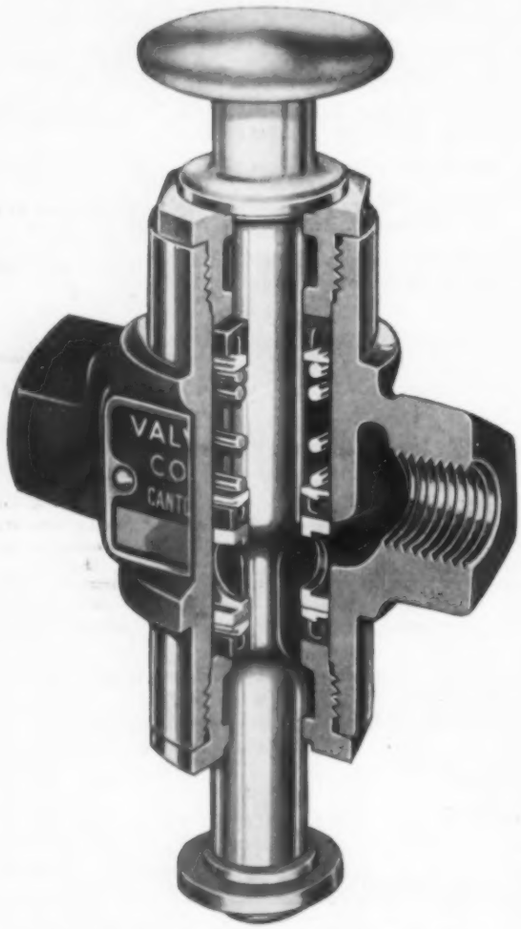
Allen & Company

January 23, 1946.

VALVAIR

TRADE MARK

AIR CONTROL VALVES



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Valvair valves are new in design and principle, standard valves have been operated more than two million times without leak with air pressure exceeding 100 lbs. They are designed for indefinite life and exceptionally hard service.

They are compact—they do not have metal seals—the body is made of cast bronze and steel parts are made of stainless steel—they will not corrode.

They are made in five sizes—¼, ⅜, ½, ¾ and 1 inch—and in two-way, three-way and four-way types. They can be furnished in eight or more different designs—knob, lever, foot, cam, clevis, single diaphragm, double diaphragm or solenoid operated.

They will control air efficiently up to 200 lbs. pressure with a very light movement. The area through the valves is equivalent to pipe size with minimum pressure drop. Write for literature.

THE SINCLAIR-COLLINS VALVE COMPANY
454 Morgan Avenue
Akron 11, Ohio

Physical Methods of Organic Chemistry. Vol. I. Edited by Arnold Weissberger. Published by Interscience Publishers, Inc., 215 Fourth Ave., New York 3, N. Y. 6 x 9 in. 736 pp. $8.50.

This is the first of two volumes designed to bring together between covers the numerous physical methods which are often applied by chemists to problems involving organic chemistry. It is composed of contributions from experts in various fields and includes descriptions of tested methods, the theoretical background for understanding and handling these methods, and the information necessary for a critical evaluation of the experimental results. This first volume consists of 16 chapters, the titles and authors being as follows:

Determination of Melting and Freezing Temperatures, Evald L. Skau and Helmut Wakeham; *Determination of Boiling and Condensation Temperatures,* W. Swietoslawaski; *Determination of Density,* N. Bauer; *Determination of Solubility,* Robert D. Vold and Marjorie J. Vold; *Determination of Viscosity,* H. Mark; *Determination of Surface and Interfacial Tension,* William D. Harkins; *Determination of Properties of Monolayers and Duplex Films,* William D. Harkins; *Determination of Osmotic Pressure,* R. H. Wagner; *Determination of Diffusiwity,* A. L. Geddes; *Calorimetry,* Julian M. Sturtevant; *Microscopy,* Edwin E. Jelley; *Determination of Crystal Form,* M. A. Peacock; *Crystallochemical Analysis,* J. D. H. Donnay; *X-Ray Diffraction,* I. Fankuchen; *Electron Diffraction,* L. O. Brockway; *Refractometry,* N. Bauer and K. Fajans.

Volume II of this work, which will contain 10 chapters, is scheduled for early publication. It will have approximately 650 pages and will contain a subject index covering both volumes. Volume II will also sell at $8.50 per copy.

•

Why Has America No Rigid Airships? By P. W. Litchfield and Hugh Allen. Published by Corday & Gross, Cleveland, Ohio. 6 x 9 in. 144 pp. $2.00.

Devoted to the theory that there is still a definite place in America's air program for the big lighter-than-air Zeppelins, this book reviews the research work that has gone into airships, the performance of Navy blimps during the war, the accumulation of operating experience by Navy and civilian pilots, and other pertinent factors. It also gives figures on the projected 10,000,000 cubic foot passenger airship, which would be about half again as large as the Hindenburg. A strong case is made out for an over-all program for ocean-crossing carriers, embracing the dirigible, the airplane and the steamship. Facts and figures are liberally sprinkled throughout the book.

FOR HIGH TENSILE, USE PHILBLACK A

(FOR FURTHER DETAILS, SEE AD ON PAGE 522)

UTILITY FAN OR V-BELT COVERING
MACHINE FOR VARIOUS SIZES
AND CROSS-SECTION BELTS

UTILITY MANUFACTURING COMPANY
Cudahy, Wisconsin
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MOLDS

We specialize in making Mechanical Molds for the rubber and allied industries. Have time open to build:

Medicine Dropper Molds up to 1100 cavities; Electric Plug Molds up to 400 cavities; Water-proof Socket Molds up to 240 cavities; Tank Ball Molds up to 80 cavities; Bib Washer Molds up to 1200 cavities; Crutch Tip Molds up to 275 cavities; Toy manufacturing molds, etc.

Molds complete with hydraulic jack attachments for easy opening and stripping assures maximum production.

We also make Cutting Machines and Cutting Dies for high-speed production methods.

We use high grade steel and selected aluminum for die-cast cavities.

Special consideration given to molds for export.

All types of mold work accepted. Send us your samples or blue prints.

Estimates or sample cavity cheerfully given.

Craftsmanship Guaranteed

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EASTHAMPTON, MASS.

See that your Maintenance Man has a complete set of these Data Sheets as issued. Previous Sheets will be sent free upon request.

MAINTENANCE DATA SHEET NO. 3

CALIBRATION OF SCOTT TESTERS (Con.)

In replacing ball bearings in the head, leave about 1/64" end play in the shaft; avoid tightening the check nuts too much.

Another cause of low reading may be in the pointer gears. Their teeth, also the bearings of the pinion shaft in the head, should be thoroughly cleaned. If gear teeth show excessive wear, gears should be replaced. In reassembling the head, a very small amount of oil should be placed in the shaft of the pinion and on the teeth of the gears.

Undue friction may be caused by the condition of the chain supporting the upper clamp. This chain should be thoroughly cleaned and re-oiled with a few drops of light machine oil. It should also be checked for undue wear on the points that contact the head drum. The drum should be inspected to make sure that the chain is not causing excessive wear on its surface.

In cleaning the head, the teeth of the quadrant should be cleaned. Inspection may reveal that quadrant teeth have become bent, requiring straightening. The points of the pawls should be inspected to see if bent or dulled.

Special case: In the head of a tester having a guide for the upper clamp, friction can occur where the clamp rod passes through, if the guide has become bent or if the machine is not installed precisely vertical.

Data Sheets 2 and 3 have covered the usual sources of inaccuracy in the weighing head. If satisfactory calibration is not obtained after following these instructions, it is recommended that the head of the tester be returned to the manufacturer.

The many Scott Testers supply the needs of testing textiles, rubber, wire, paper, etc., up to 1 ton tensile.

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SCOTT TESTERS, INC.

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We'll give you a hint now. Franklin's Rubber Dressing prevents oxidation, increases durability, improves appearance, *increases saleability*. But that's only a small part of the story. Mail the coupon today for complete information.

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BOOKLETS, CATALOGS, Etc.

Plastics in Building: A Report to Architects, Decorators & Builders. By Paul Robinson Hunter. Issued by Pacific Plastics, 124 W. 4th St., Los Angeles 13, Calif. 8 x 10½ in. 36 pp.

This booklet comprises a study of plastics and its practical application to building. The author is a leading West Coast architect. Divided into several sections, all illustrated with numerous excellent photographs, it first describes the significance of plastics and then discusses their structural uses in plywood and overlays, walls and insulation, and their decorative uses in screening and blinds, flooring, hardware accessories and trims, painting, lighting and electric wiring, tubing and piping, and home furnishing. In addition it includes a list of plastic trade names encountered in the architectural field and a glossary of plastic terms.

•

How to Get Extra Service Out of Truck Tires. Rubber Manufacturers Association, 444 Madison Ave., New York 22, N. Y. 8 x 10½ in. 28 pp.

This manual brings together for the first time all previously published material on the care and maintenance of heavy-duty tires. Extensively illustrated with photographs and diagrams, the manual has eight sections which cover the following: (1) Over-loading; (2) Over-inflation; (3) Methods of avoiding over-inflation; (4) Under-inflation; (5) Effects of speed, starts and stops, temperature, road surfaces, and mechanical irregularities contributing to tire wear; (6) Tube mounting; (7) Dual tire matching; (8) Driver habits. An inflation table for truck tire loads is also included.

•

Thermex High Frequency Heating. Girdler Corp., 224 E. Broadway, Louisville, Kentucky. 8¼ x 10¾ in. 28 pp.

This booklet, after describing the typical uses of electronics in everyday life, discusses the use of high frequency heating on plywood, molded plastics, rubber and laminates. Effective use is made of photographs and illustrations to show how high frequency heating has affected the molded plastics industry and its possibilities in plywood production. Among the Thermex models discussed are the portable general purpose units, the "Red Head" automatic models for the plastics industry, and the general purpose stationary units with a number of accessories.

•

Metco Type Y Metallizing Gun for Production Metallizing. Metallizing Engineering Co., Inc., 38-14 30th St., Long Island City 1, N. Y. 11 x 8½ in. 16 pp.

This catalog contains a brief but detailed description of the metallizing gun manufactured by the company for use in production metallizing. Profusely illustrated by excellent photographs of the equipment, the catalog "strips" the gun to show how certain operating difficulties have been eliminated. It describes and illustrates the gas head, the lubrication system, the new controlled power unit and the spraying speeds and costs.

•

Velon Plastics. Firestone Industrial Products Co., Akron, Ohio. 8½ x 11 in. 12 pp.

Divided into three sections, this booklet covers the application of each of the three Velon plastics. It contains sections on the filament, Velon; the film, Velofilm; and the plastic leather, Veloflex. Handsomely illustrated with color photographs and drawings, it discusses the use of Velon as upholstery and screening, the use of Velofilm for packaging and its adaptability to general dry goods fabricators, and the use of Veloflex in fields formerly confined to natural leather.

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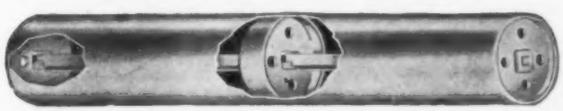

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MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK FEB. 14, 1946

Natural Rubber

THE big news in the field of natural rubber during the past month was the long-awaited announcement that an agreement had been reached between the United States and the major rubber-producing countries—England, Holland and France—on a transitional price for rubber. The price is 20 cents per pound, delivered free on board ocean-going vessels in the Far East, which means a price of approximately 21¾ cents per pound laid down in New York. It must be emphasized that the agreements cover the transitional period only, and new prices will be determined within the next few months.

Conclusion of negotiations between the principal consumer and the principal producers will have several immediate effects, among them the distribution of some 40,000 tons of natural rubber warehoused in the United States. This rubber, mostly from Malaya, came to this country in lots ranging from 3,000 to 8,000 tons, over a period of months and awaited a price decision before it could be distributed. The price agreement was made retroactive to VJ Day, so that it covered all of the rubber shipped from the Far East since that time. Not all of this rubber will go to American rubber manufacturers, but the bulk of it will.

Up until recently international allocation of natural rubber supplies was in the hands of the Combined Raw Materials Board, through its Rubber Committee. Transfer of such control has been made to the Combined Rubber Committee, a new organization comprising representatives of the six major rubber producing and consuming countries. Control of this nature will undoubtedly continue during the entire period of world shortage of natural rubber.

Prices shown below are ceilings set by the Office of Rubber Reserve, Reconstruction Finance Corporation:

	C	N-C
Plantations—		
Ribbed Smoked Sheets, 1X...	22½	40
Thick Pale Latex Crepe, 1X..	22½	40
Thin Pale Latex Crepe, 1X..	22½	40
Thick Brown Crepe, 1X.....	21⅜	38¾
Thin Brown Crepe, 1X.....	21⅜	38¾
Thick Remilled Blankets, #1..	21⅜	38⅞
Rolled Brown or Flat Bark..	18	35½
Smoked Blankets, #1.....	21⅛	38⅝
Claro Brand 1XRSS.....	22½	40
Sole Crepe Trimmings.....	22	39½
Sole Crepe	22½	40
Wild—		
Uncut Fines, Crude.....	15	29
Cut Fines, Crude.....	15½	29¼
Cut Fines, Washed & Dried..	22½	40
Upriver Coarse, Crude.....	12⅝	26⅛
Upriver Coarse, Washed & Dried	20¼	37¼
Caucho Ball, Crude	11⅝	24⅜
Caucho Ball, Washed & Dried	19½	37
Guayule—		
Carload Lots	17½	31
Less than Carload Lots	18	31½
Balata—		
Surinam Sheet	42½	42½
Manaos Block	38¾	38¾
Colombian Block	38¾	38¾
Peruvian Prime	38¾	38¾
Chicken Wire	23¼	23¼
Latex—		
Normal, Tank Car Lots	26	43½
Creamed, Tank Car Lots	26¾	44¼
Centrifuged, Tank Car Lots..	27¾	45¼
Heat-Concentrated, Carload Drums	29½	47

C for Civilian Use; N-C for Non-Civilian Use.

Scrap Rubber

The demand for scrap rubber has improved somewhat since our last report, although the downward trend in prices noted in the past two or three months continues. Inventories of synthetic rubber scrap are still too large for most dealers and some concern is beginning to be expressed regarding the growth of such inventories. The percentage of synthetic scrap sold to reclaimers along with natural rubber scrap is gradually increasing, but not enough to deplete current inventories. The time when reclaimers will have to purchase fairly large quantities of all-synthetic scrap or greater mixtures of natural and synthetic scrap, due to the lack of all-natural rubber scrap, is growing closer, but is still a few months away. Final figures on its wartime scrap operations issued by the Office of Rubber Reserve, successor to the Rubber Reserve Co., indicate that it purchased 1,109,000 tons in all, of which it sold 927,000 tons. The balance of 182,000 tons consists of non-saleable scrap, which will probably be discarded. Prices shown below are ceilings on typical grades of scrap:

(Prices to Consumers, Delivered Akron)

Mixed passenger tires .....ton		$20.00
Beadless truck tires.....ton		26.00
Mixed truck tires.....ton		20.00
Beadless passenger tires.....ton		26.00
No. 1 passenger peelings.....ton		52.25
No. 1 truck peelings.....ton		52.25
No. 2 passenger tubes.....lb.		.07¾
Red passenger tubes.....lb.		.07½
Black passenger tubes.....lb.		.06¾
Mixed passenger tubes.....lb.		.06½
No. 2 truck tubes.....lb.		.07½
Red truck tubes.....lb.		.07¾
Black truck tubes.....lb.		.06½
Buffings .....ton		35.00
Bicycle tires .....ton		15.00
Air bags and water bags.....ton		15.00
Boots and shoes.....ton		33.00

Tire Fabrics

The situation in the tire fabric field remains unchanged, with practically no demand for such fabrics. Consequently, prices are nominal and in many quarters are not even being quoted. The prices shown below are those which were in force on or about January 15, 1942.

(Prices Net at the Mill)

Peeler, carded, 23/5/3.....lb.	.43½	@	.44
Peeler, carded, 23/4/3.....lb.	.44½	@	.45
Peeler, carded, 15/3/3.....lb.	.41½	@	.42
Peeler, carded, 15/4/2.....lb.	.41½	@	.42
Peeler, carded, 13/3/3 .lb.	.40½	@	.41
CHAFERS			
Carded, American, 1 1/16".....lb.	.43½	@	.44
Carded, American, 1".....lb.	.39½	@	.48

Sheetings

48x40	36	in.	5.50	.....lb.	—	@ 8.272
40x40	36	in.	6.15	.....lb.	—	@ 7.398
40x36	36	in.	6.50	.....lb.	—	@ 7.000
48x48	40	in.	2.50	.....lb.	—	@17.200
48x48	40	in.	2.85	.....lb.	—	@15.087
56x60	40	in.	3.60	.....lb.	—	@12.638
48x44	40	in.	3.75	.....lb.	—	@11.733

Note: Prices shown above are ceiling prices set by order of the O.P.A.

Cotton

The price of middling uplands on the Cotton Exchange has swung in the wide range of 131 points since our last report (January 17), high for the period being 26.63 today, February 14, and low 25.32 on January 18. The average price of middling uplands for the month of January was 25.49, based on 26 trading days. The price trend has been upward in the past several weeks. Two major factors contributed to the trend, first the belief that the announcement of a new wage-price formula by the Administration would leave the road open for higher prices in all commodities, and second the anticipation of higher consumption requirements in the year ahead combined with little or no increase in cotton plantings. Another factor contributing to the trend was an expected rise in export requirements. Great Britain, for example, was reported to be in the market for an unspecified amount of cotton for early delivery. The forthcoming new wage-price formula is expected to have a direct bearing on the proposed ceiling on raw cotton announced by OPA Director Chester Bowles recently. A ceiling considerably higher than the 24.09 cents for 15/16 middling in Group 1 area contained in the initial announcement is anticipated. Quotations for middling uplands on the Exchange follow:

	Jan. 17	February 14		
	Close	High	Low	Close
March	24.60	26.05	25.85	25.94
May	24.58	26.09	25.93	26.02
July	....	26.12	25.92	26.05

Reclaimed Rubber

No slackening of any kind in the demand for reclaimed rubber is yet visible, according to reclaimers, and even the long-extended automotive and steel strikes have not lessened the demand in recent weeks. Some reclaimers, in fact, were hopeful that these strikes might provide a "breather," but it has proved to be wishful thinking. Reclaimers also report little difficulty in securing natural rubber scrap, although the percentage of synthetic scrap accompanying recent shipments is gradually increasing. The labor picture continues to improve and higher production is being achieved. Efforts to institute workable methods of properly grading various types of scrap continue to be made. Prices shown below are ceilings on typical grades of reclaim:

Shoe			
Unwashed .....lb.	.07½	@	.07¾
Tube			
Black Tube .....lb.	.11¾	@	.12
Red Tube .....lb.	.12½	@	.12¾
Tires			
Black (acid process) .....lb.	.08	@	.08¼
Black, selected tires .....lb.	.07	@	.07¼
Truck, Heavy Gravity....lb.	.09	@	.09¼
Miscellaneous			
Mechanical blends .....lb.	.05	@	.06
White .....lb.	.13½	@	.13¾

Ducks

Enameling (single filling)....lb.	—	@	.44¼
Belting and Hose.....lb.	—	@	.39
Single filling, A grade.....lb.	—	@	.19¾
Double filling, A grade.....lb.	—	@	.20¾

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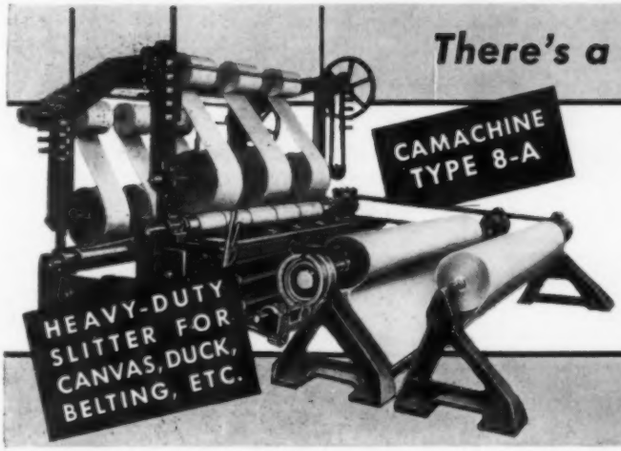

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CHEMICAL MARKETS

New York, Feb. 14, 1946
All Prices F.O.B. Works

ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.28 @	.33
A-10	lb.	.36 @	.42
A-19	lb.	.52 @	.58
A-32	lb.	.59 @	.69
A-77	lb.	.42 @	.55
A-100	lb.	.42 @	.55
Aldehyde ammonia, crystals	lb.	.65 @	.70
Altax	lb.	.39 @	.41
Beutene	lb.	.59 @	.64
B-J-F	lb.	.34 @	.39
Butasan	lb.	— @	1.10
Butyl Zimate	lb.	— @	1.10
Captax	lb.	.34 @	.36
Crylene	lb.	.40 @	.47
Di-Ortho-Tolyguanidine	lb.	.44 @	.46
Diphenylguanidine	lb.	.35 @	.41
El-Sixty	lb.	.36 @	.43
Ethasan	lb.	— @	1.10
Ethyl Tuads	lb.	— @	1.25
Ethyl Zimate	lb.	— @	1.10
Ethylidine aniline	lb.	.42 @	.43
Formaldehyde aniline	lb.	.31 @	—
Geantal	lb.	.39 @	.48
Hepteen	lb.	.34 @	.39
Hexamethylenetetramine	lb.	.33 @	—
Lead Oleate, No. 999	lb.	.13 @	—
Witco	lb.	— @	.16½
Ledate	lb.	— @	1.20
Methasan	lb.	— @	1.20
Methyl Tuads	lb.	— @	1.25
Methyl Zimate	lb.	— @	1.20
Monex	lb.	— @	1.25
Pentex	lb.	.74 @	.84
Phenex	lb.	.49 @	.54
Pip-Pip	lb.	— @	1.63
R & H 50-D	lb.	.42 @	.43
R-2 Crystals	lb.	— @	1.55
Rotax	lb.	.44 @	.46
Safex	lb.	1.15 @	1.25
Santocure	lb.	.60 @	.67
Selenac	lb.	— @	1.60
SPDX-G	lb.	.53 @	.58
Super-Sulfur No. 2	lb.	.13 @	.15
Thiocarbanilid, drums	lb.	.28 @	.33
Thiofide	lb.	.39 @	.46
Thiotax	lb.	.34 @	.41
Thiurad	lb.	— @	1.25
Trimene	lb.	.54 @	.64
base	lb.	1.03 @	1.18
Triphenylguanidine	lb.	.45 @	—
Ulto	lb.	.99 @	1.04
Ureka	lb.	.50 @	.57
Blend B	lb.	.50 @	.57
Blend C	lb.	.48 @	.55
Vulcanex	lb.	.42 @	.43
Vulcanol	lb.	.85 @	—
Inorganic			
Litharge, domestic	lb.	.08 @	.08½
Magnesia, calcined, heavy	lb.	.08 @	.12

COLORS

Blues [b]			
Prussian	lb.	.36 @	—
Ultramarine	lb.	.17 @	.27
Browns [b]			
Mapico	lb.	.1135 @	—
Umber, Turkey	lb.	.04¼ @	—
Greens [b]			
Chrome	lb.	.23 @	—
Guignet's Green	lb.	.70 @	—
Reds			
Antimony crimson, 15/17	lb.	— @	—
Indian	lb.	.08¼ @	—
Domestic (Maroon)	lb.	.11 @	—
Mapico	lb.	.096 @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red	lb.	.09¼ @	—
Whites [b]			
Cryptone No. 19	lb.	.0560 @	.0585
Cryptone CB No. 21	lb.	.0560 @	.0585
Cryptone ZS-800	lb.	.0825 @	.0850
Lithopone:			
Albalith	lb.	.04¼ @	.04½
Astrolith	lb.	.04¼ @	.04½
Azolith	lb.	.04¼ @	.04½
Ray-cal	lb.	.05½ @	.05¾
Rayox	lb.	.14½ @	.15¼
Titanox A	lb.	.14½ @	.14¾
Titanox B	lb.	.05¾ @	.06
Titanox C	lb.	.05½ @	.05¾
Zinc Oxide—American Process [b]			
American Azo:			
ZZZ (lead free)	lb.	.07¼ @	.07½
Anaconda, lead free	lb.	.07¼ @	.07½
Horsehead Lead Free Brand:			
Special—3	lb.	.07¼ @	.07½
XX Red—4	lb.	.07¼ @	.07½
Kadox, black label—15	lb.	.07¼ @	.07½
Red label—17	lb.	.07¼ @	.07½
72	lb.	.07¼ @	.07½
St. Joe, black label	lb.	.07¼ @	.07½
green label	lb.	.07¼ @	.07½
red label	lb.	.07¼ @	.07½
U. S. P.—7, bbls.	lb	.10¼ @	.10¼
Zinc Oxide—French Process [b]			
Florence White Seal—7 bbl.	lb.	.09½ @	.09¾
Green seal—8	lb.	.09 @	.09¾
Red seal—9	lb.	.08½ @	.08¾
Yellows [b]			
Cadmolith	lb.	.55 @	.60
Chrome	lb.	— @	.50
Mapico	lb.	.071 @	—

[a] Price Ceilings.
[b] Price Suggestions or Agreements.

BLACKS
(In bags, carload lots)

Arrow Compact		.05¼ @	—
Atlantic		.05¼ @	—
Certified		.05¼ @	—
Certified Spheron		.05¼ @	—
Continental		.05¼ @	—
Disperso		.05¼ @	—
Dixiedensed		.05¼ @	—
Dixiedensed 66		.05¼ @	—
Excello		.05¼ @	—
Furnex		.03½ @	.06
Furnex Beads		.03½ @	.06
Gastex		.03½ @	.06
Kosmobile		.05¼ @	—
Kosmobile 66		.05¼ @	—
Kosmos-Dixie 20	lb.	.03½ @	.06
Micronex (Amarillo)		.05¼ @	—
Micronex Beads (Amarillo)		.05¼ @	—
Pelletex		.03½ @	.06
P-33		.04 @	.06½
Philblack A	lb.	.05 @	—
Sterling		.035 @	—
Supreme		.05¼ @	—
Thermax		.0225 @	.05
Wyex		.05¼ @	—

COMPOUNDING MATERIALS

Aluminum Flake	ton	18.00 @	24.50
99½%-300	ton	— @	16.50
86-90%-300	ton	— @	13.50
Asbestine	ton	16.50 @	20.00
Atomite	ton	— @	27.50
Barium carbonate (98-100%)	ton	47.00 @	49.00
Barytes	ton	25.35 @	36.00
Bentonite	ton	11.00 @	16.00
Blanc fixe, dry	ton	60.00 @	67.00
Calcene	ton	37.50 @	43.00
Catalpo (fact)	lb.	.02 @	—
Clay, Aerfloted, Suprex	ton	11.00 @	23.50
Aerfloted Paragon	ton	10.00 @	22.50
Champion	ton	— @	11.00
Crown	ton	— @	11.00
Dixie	ton	11.00 @	23.50
Kaolloid	ton	— @	9.00
Langford	ton	— @	8.50
Magnolia	ton	— @	10.00
McNamee	ton	10.00 @	22.50
Par	ton	— @	11.00
Witco	ton	10.00 @	—
Kalite No. 1	ton	26.00 @	52.00
Kalvan	ton	100.00 @	126.00
Keystone white	ton	— @	14.00
Magnesium carbonate	lb.	.06¼ @	—
Mineralite	ton	— @	30.00
Pyrax A	ton	— @	8.40
Rottenstone (powd. Dom.)	ton	25.50 @	37.50
Rubberol	lb.	— @	.17½
Silene EF (calcium silicate)	lb.	.055 @	.06
Silical	ton	65.00 @	85.00
Snowflake white	ton	— @	16.00
Talc, domestic	ton	14.50 @	—
Whiting, commercial	ton	16.00 @	26.00
Witco	ton	— @	6.50
Witcarb R	ton	— @	100.00
Witcarb R-12	ton	— @	40.00
Wood Flour (100 mesh)	ton	30.00 @	32.00

MINERAL RUBBER

285°-300° Mineral Rubber	ton	25.00 @	27.00
Black Diamond	ton	25.00 @	—
Dielex	lb.	— @	.06
Hard Hydrocarbon	ton	25.00 @	27.00
MilliMar	lb.	— @	.05½

MISCELLANEOUS

Aromatics—Rodo #0	lb.	4.00 @	4.50
Rodo #10	lb.	5.00 @	5.50
Curodex 19	lb.	2.75 @	—
Curodex 188	lb.	3.50 @	—
Curodex 198	lb.	4.50 @	—
Para-Dors	lb.	4.50 @	—
Areaklene No. 375	lb.	.35 @	.50
Darvan (dispersing agent)	lb.	.30 @	.39
Santomerse S	lb.	.11 @	.25
Sponge Paste	lb.	— @	.18
Sunproof	lb.	.22¼ @	.27½
Tonox	lb.	.50 @	.59
Tv-Ply	gal.	6.75 @	8.75
Unicel (blowing agent)	lb.	.50 @	—

SOFTENERS

Acids			
Acetic, 28%, bbls. [a]	100 lb.	3.38 @	3.63
Nitric, 36 degrees	cwt.	5.00 @	—
Acids, Fatty			
Laurex	lb.	.14¾ @	.17¾
SL-20	lb.	.11 @	.13
Stearex Beads	lb.	.10 @	.11
Stearite	lb.	.10 @	—
Alkalies			
Caustic Soda, 76%	cwt.	2.70 @	5.70
Soda Ash, 58%	cwt.	1.15 @	2.98
Oils			
Degras, bbls. [a]	lb.	.10 @	.12
Para-Flux	gal.	.17 @	.18
Para-Lube	lb.	.046 @	.048
Petrolatum, amber	lb.	.03¼ @	—
Pigmentaroil, tank cars	gal.	.20½ @	—
in drums	gal.	.26½ @	.27½
Pine, tanks [a]	gal.	.55 @	—
Rosin Oil, cmpd.	gal.	.40 @	—
Rubberol	lb.	.13½ @	.14
Rubtack	lb.	.10 @	—
Seedine, c.l.	lb.	.07¼ @	—
Witco Palm Oil	lb.	— @	—
Witco Softener No. 20	gal.	.20 @	—
Woburn No. 8, c.l.	lb.	.06 @	—
Resins and Pitches			
Pitch, Burgundy	lb.	.08 @	—
coal tar	ton	19.00 @	22.00
hardwood	ton	16.00 @	22.50
pine, 200 lb. gr. wt.	bbl.	— @	4.50
Pigmentar, tank cars	gal.	.20½ @	—
in drums	gal.	.26½ @	.27½
Retort Pine Tar, drums	gal.	.26½ @	.27½
Solvents			
Acetone, pure [a]	lb.	.07 @	—
Benzene, 90%, tank car	gal.	.14 @	—
Beta-Trichlorethane	gal.	— @	.20
Bondogen	lb.	.98 @	1.25
Carbon, bisulfide	lb.	05 @	.08¼
Carbon tetrachloride	gal.	.73 @	1.27
Dichlorethylene	lb.	— @	—
Dipentene, cml., drums	gal.	.48 @	.50
Ethylene dichloride	lb.	.07½ @	.08¼
Plastogen	lb.	.07¾ @	.12
Reogen (drums)	lb.	.11½ @	.15
Rub-Sol	gal.	.09½ @	—
Trichlorethylene	lb.	.08 @	.09¼
Turpentine, steam dist., drums	gal.	.80 @	.83
Waxes			
Antisol	lb.	.22½ @	.23½
Beeswax, white [a]	lb.	.58 @	—
Carnauba, yellow [a]	lb.	.83¼ @	—
Ceresin, white, dom.	lb.	.13½ @	.15
Montan, dom.	lb.	.30 @	.35
Paraffin [a]			
Yellow crude scale, 124/126	lb.	.04¼ @	—
Refined, 120/122	lb.	.05¼ @	—

ANTI-OXIDANTS

Agerite Alba	lb.	1.95 @	2.09
Gel	lb.	.52 @	.54
Hipar	lb.	.61 @	.63
Powder	lb.	.40 @	.42
Resin	lb.	.43 @	.45
Resin D	lb.	.40 @	.42
White	lb.	1.23 @	1.33
Albasan	lb.	.69 @	.74
Antox	lb.	.54 @	.56
B-L-E	lb.	.40 @	.49
Flectol H	lb.	.40 @	.47
Neozone A, C, D, E	lb.	.40 @	.63
Oxynone	lb.	.77 @	.90
Retardex	lb.	.44½ @	.47½
Santoflex B	lb.	.40 @	.47
Santoflex BX	lb.	.54 @	.61
Santovar O	lb.	1.15 @	1.40
S.C.R.	lb.	.32 @	.34
Stabilite	lb.	.48 @	.50
Stabilite Alba	lb.	.69 @	.74
VGB	lb.	.43 @	.52

EXTENDERS

Naftolen R-100	lb.	.10 @	.12

LUBRICANTS—MOLD & RUBBER SURFACE

Aresklene	lb.	.35 @	.50
Cocoa Soapstock	lb.	.06 @	.08
Colite	gal.	.90 @	1.15
Dipex	lb.	.06 @	.08
Glycerized Liquid Lubricant	gal.	— @	1.35
Lubrex	lb.	.25 @	.30
Mineralite	ton	— @	30.00
Sericite	ton	65.00 @	75.00
Soap Tree Bark, cut, sifted	lb.	.06 @	.08

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.25 @	—
Amberex Type B	lb.	.18¼ @	—
Black	lb.	.08½ @	.13
White	lb.	.09 @	.15
Brown	lb.	.10 @	.14
Neophax A	lb.	.16½ @	—

VULCANIZING INGREDIENTS

Dispersed Sulfur No. 2	lb.	.08 @	.12
Sulfur Chloride, yellow (drs.)	lb.	.03 @	.08½
Sulfur, rubber makers			
Refined (bags)	cwt.	2.55 @	—
Commercial (bags)	cwt.	2.20 @	—
Telloy	lb.	1.75 @	—
Vandex	lb.	1.75 @	—
Vultac No. 1	lb.	.38 @	.45
Vultac No. 2	lb.	.38 @	.45
Vultac No. 3	lb.	.42 @	.49

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Replies to keyed advertisements will be forwarded to advertiser without charge.

Address all replies to Box Numbers care of RUBBER AGE, 250 West 57th Street, New York 19, N. Y.

POSITIONS WANTED

RUBBER CHEMIST, five years' experience in compounding, research, and factory processing of natural and synthetic rubber and plastics for wire and cable, and tire industries. Desires responsible position combining research with factory problems or one as technical sales representative. Address Box 2067, RUBBER AGE.

SUPERVISOR and practical rubber man, age 37, twenty-one years' experience in rubber and synthetic rubber, mixing, extruding, calendering, and molding of mechanical rubber goods, also compounding. Address Box 2069, RUBBER AGE.

FACTORY MANAGER—RUBBER OR PLASTICS—available March 1st. B.S. degree. Long and successful career in tire design and development, mechanical goods and sundries production, together with all types of plastics molding. Technical sales and sales engineering. Factory manager for the past twelve years. Address Box 2077, RUBBER AGE.

MECHANICAL RUBBER ENGINEER: Technical or sales engineering desired. Have five years experience in rubber and synthetic molded, extruded and fabrication problems, including design, molds, and production. Also have experience in setting up Production Drawing Departments. Age 30. Address Box 2088, RUBBER AGE.

TECHNICAL SALES or sales service position in rubber specialties desired by young man with excellent knowledge of rubber to metal items, rubber mountings, and vibration isolation. Experience includes development, compounding, production, supervision and sales service. Address Box 2083, RUBBER AGE.

YOUNG MAN with experience in bonding mediums, rubber adhesives, etc., seeks position in technical sales field. Address Box 2084, RUBBER AGE.

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For a job that requires the energy and aggressiveness that stems from good health, and the mature judgment which comes only with a background of broad experience. Here it is:

Education: B. S. in Chemistry.

Experience: Rubber Industry—Analytical chemist, Special machine designer, Tire compounder and Chief chemist.
Pigments—Product development and technical sales.
Synthetic Rubber—Production Superintendent.
Fine Chemicals—General Manager of organic chemicals extraction plant.

Prefer Eastern section of U. S. A. but willing to go anywhere if the opportunity seems to justify.

Address Box 2079, RUBBER AGE

HELP WANTED

SUPERINTENDENT for nationally known sole and heel manufacturing company. Unusual opportunity for right man. State age, education, where employed during past ten years and where employed at present, also starting salary desired. Address Box 2035, RUBBER AGE.

TIRE AND TUBE DEVELOPMENT AND CONSTRUCTION ENGINEERS—Excellent opportunity in progressive Eastern company. Unlimited opportunity for advancement. Salary commensurate with ability. Address Box 2041, RUBBER AGE.

CHEMIST, who has had experience compounding rubber for sheet goods and proofed fabrics. Finished products are baby pants, crib sheets, raincoats, protective clothing, etc. Excellent opportunity in modern laboratory especially for a man with ideas. This firm has best possible employee relations and takes pride in letting its personnel develop to the fullest degree. Plant employs 700 and is located in city of 15,000. Excellent living conditions. Write giving experience. Address Box 2052, RUBBER AGE.

HELP WANTED (Continued)

WANTED: NIGHT SUPERINTENDENT for mechanical rubber goods manufacturer in Midwest city of 14,000 to take complete charge of all manufacturing operations. Night shift of approximately 100. Write giving age, experience, and salary. Address Box 2064, RUBBER AGE.

TECHNICAL SALESMAN for territory of Boston and vicinity to sell lacquer and synthetic coating. Familiarity with coating cloth and a general knowledge of rubber manufacturing preferred. Address Box 2071, RUBBER AGE.

TIRE CURING FOREMAN—Must have experience and capability in supervising tire production. Permanent position with attractive salary for man with resourcefulness and ability. Eastern concern. Specify all qualifications first letter. Address Box 2042, RUBBER AGE.

WANTED—MILL OPERATOR. Experienced in the compounding and curing of natural or synthetic rubbers with some knowledge of the physical testing of cured stocks, to work in laboratory located in metropolitan New York. Address Box 2070, RUBBER AGE.

SUPERINTENDENT for small rubber plant—broad experience, planning and running quality production, machine efficiency, compounding, calendering, slabs and molded goods. State age, education, experience, present earnings, and salary expected. Address Box 2073, RUBBER AGE.

TIRE FINISHING SUPERVISOR—Opening for man with experience in supervising duties connected with cured tire final finishing. Position offers excellent opportunity for advancement. All replies confidential. Address Box 2043, RUBBER AGE.

TECHNICAL SALESMAN for territory of metropolitan New York and vicinity to sell lacquer and synthetic coating. Familiarity with coating cloth and a general knowledge of rubber manufacturing preferred. Address Box 2072, RUBBER AGE.

FOREMAN to take charge of milling and extruding department. Crude and synthetic rubber experience. Plant located in New England. State experience and salary in first letter. Address Box 2075, RUBBER AGE.

CHEMICAL RESEARCH DIRECTOR

New York City firm affords an unusual opportunity to a thoroughly experienced administrator to take full charge of its industrial research laboratory and staff of research and control chemists.

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State salary requirements for first year's demonstration of ability; subsequent increases depend on our finding the right man.

Box S3, 50 E. Fordham Rd., N. Y. 58, N. Y.

HELP WANTED (Continued)

CORD SET PRODUCTION MANAGER WANTED. Excellent opportunity for man living in southern California. Requirements: Experience in the manufacture and assembly of cord sets with wire mill or cord set manufacturers. Address Box 2090, RUBBER AGE.

BANBURY MIXER OPERATOR AND COMPOUNDER. Man who is experienced and capable of taking charge of new No. 11 Banbury and training inexperienced help. Location Iowa. Send letter outlining qualifications. Address Box 2081, RUBBER AGE.

TUBE ROOM SUPERINTENDENT OR FOREMAN—Must be capable of supervising all tube room operations. Opening offers unlimited opportunity for man of experience and capability. Progressive Eastern concern. All replies strictly confidential. Address Box 2044, RUBBER AGE.

FOREMAN to take charge of press line. Molded and mechanical goods experience required. Plant located in New England. State experience and salary in first letter. Address Box 2076, RUBBER AGE.

CALENDER AND MILLMEN. Excellent future with new concern working on plastic film. Good chance for advancement as supervisors. Plant located at 109 Oxford Avenue in Jersey City. PRESTO PLASTIC PRODUCTS, Bergen 4-1931.

EXPERT TECHNICIAN thoroughly familiar with processing rubber for electric conductor factory in Santiago, Chile. Write giving professional references, personal details, salary desired, etc., to M. CASTELLVI, 150 Broadway, New York 7, N. Y.

CHEMIST with some compounding experience on soles and heels. Permanent position with large nationally known company. Outstanding opportunities for advancement. State age, education, experience, including previous and present employment, and starting salary desired. Address Box 2034, RUBBER AGE.

BUSINESS OPPORTUNITIES

RUBBER GOODS MFG. PLANT FOR SALE, going, profitable concern with good equipment. Total price $30,000. Address Box 1732, RUBBER AGE.

We do Rubber Compounding, Light Color Stock Mixings and GR-S Breakdown. FRANK T. BAKER, RUBBER PRODUCTS AND COMPOUNDING, 63 Arch Street, Fall River, Massachusetts.

PATENTED SANITARY DRIPLESS POURING SPOUT, consisting of a resilient base ring adapted to fit into cap seat of Cream or Milk Bottle and a pouring lip extending from the ring. In pouring, the fluid can not contact mouth of bottle and it is impossible to drip down the side. Designed to be covered with bottle cap. Royalty only. P. H. KRAETCH, 2165 Leif Erickson Drive, Astoria, Oregon.

RUBBER FACTORY has open time for molding all types of rubber products. ACE MOULDED RUBBER PRODUCTS CORPORATION, 353 Rockaway Avenue, Brooklyn 12, N. Y. Telephone: DEcker 2-8527.

TERMINATIONS? CANCELLATIONS? WANTED: Chemicals, Colors, Pigments, Resins, Solvents, Oils, Waxes, Lacquers. Other Materials, Supplies, Equipment, etc. Address Box 1825, RUBBER AGE.

A GOOD, OLD HUNGARIAN FIRM, having best references and the necessary funds, wishes to represent an American firm manufacturing rubber goods, either sanitary or for the motor car industry. Inquiries to be sent to MR. LADISLAUS FABIAN, 30 Pannonia Street, Budapest V, Hungary.

AGENT IN BRAZIL, specializing in chemicals for the rubber industry, wants agency or distributorship for accelerators and all other rubber chemicals. Now selling to every rubber factory in Brazil. Reference: Bank of Canada, Sao Paulo Branch. Address: ALFREDO STRANSKY, Rua Sta. Ernestina 124, Sao Paulo, Brazil.

PLANT WANTED for making latex and molded rubber bathing caps. Large quantities required. Address Box 2086, RUBBER AGE.

WANTED: Large quantity latex and rubber molded caps. Address Box 2087, RUBBER AGE.

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If you can supply regularly, contact
NASSAU TRADING COMPANY
120 Liberty Street **New York 6, N. Y.**
Telephone: REctor 2-0164

BUSINESS OPPORTUNITIES (Continued)

AGENCY WANTED for line of rubber mats, matting and stair treads for Metropolitan New York District. Address Box 2089, RUBBER AGE.

WANTED TO BUY: Going plant making automobile inner tubes. Replies will be held strictly confidential. Address Box 2065, RUBBER AGE.

WORKING PARTNER WANTED for Pacific Coast rubber goods manufacturing plant. Must be thoroughly familiar with latest production methods. $15,000 will purchase half interest. Remarkable opportunity for right party. Address Box 2004, RUBBER AGE.

TIRES WANTED: Factory rejects and seconds in 4 or 6 ply—550 x 16, 600 x 16, 650 x 16, 700 x 16, 550 x 17, 525 x 18, 500 x 19, 500 x 21, 550 x 18—in truck load lots or carloads. Will pay cash or certified check F.O.B. shipping point. WALLACE & WALLACE, INC., 2515 Wilkinson Boulevard, Charlotte, N. C. Phone 4-3974.

REPRESENTATION IN FRANCE

Business man, well-known in rubber, textile field would represent American firms seeking important dealings in raw and manufactured goods. Address GODEFROY LE GROS, 16 Rue Theophraste Renaudot, Paris 15. Tel. PRO 73-80. References: Brown Bros., Harriman & Co., 59 Wall Street, New York 5, N. Y.; Mr. John Curtiss, 250 Park Avenue, New York 17, N. Y.

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Prominent Manufacturer
of Mills, Calenders, Hydraulic Presses, Vulcanizers and special Heavy Equipment

Preference will be given individuals having knowledge of Mill Room processes and who are well acquainted with the key personnel of Rubber Companies in these territories. Send brief outline of experience and present occupation to Box 2078, RUBBER AGE.

EQUIPMENT WANTED

WANTED: Complete new or used equipment for coating plant including calenders, mills, spreaders, pony mixers, festooning ovens, slitters, embossers, etc. Also laboratory calender, mill, mixer, and press. Address Box 2066, RUBBER AGE.

WANTED: One 6" x 13" or 8" x 16" laboratory rubber mill with drive, motor, and controls for 60 cycle 3 phase 220 V current. Also one one-gallon size internal kneading machine equipped with heating and cooling jackets and powered by 1 HP or greater explosion proof driving motor. Please state price, location, and complete description. Address Box 2080, RUBBER AGE.

WANTED—Hydraulic Presses, with pumps and accumulators, Banbury Mixer, Mills, Calender, Tubers, any condition. Address Box 2085, RUBBER AGE.

WANTED: One #3 Royle tubing machine in good operating condition, with or without gear reduction drive and motor. Address ASSOCIATED RUBBER PRODUCTS COMPANY, Quakertown, Pennsylvania.

QUOTATIONS WANTED ON FOLLOWING EQUIPMENT:
VULCANIZING PRESS—Heavy steel frame construction, for rubber belts and conveyor belts; total pressure, 3300 tons; platen size, 1100 x 6000 mm.
CUTTING MACHINE—Automatic machine for cutting food bottle rings from rubber tubes.
TUBING MACHINES with stock worms of different current sizes, for natural rubber, synthetic rubber, and thermoplastic materials.
MILLS for mixing and plastifying.
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Address: R. & E. HUBER, LIMITED, Pfaeffikon (Zh), Switzerland.

WANTED
Three or four roll laboratory calender; also four roll 60" calender.
ADHESIVE PRODUCTS CORPORATION
1660 Boone Avenue
BRONX 60, N. Y.

EQUIPMENT FOR SALE

FOR SALE: One Banbury Mixer, Laboratory Model Size 00; having hand operated weight; with base, hinged-sides and rotor chambered for heating and cooling; powered with 7½ H.P., 220 volt, three phase, 60 cycle induction motor with starter. Machine is an early model but it has had comparatively little use. Address Box 2047, RUBBER AGE.

FOR SALE: Wabash Hydraulic Press, Laboratory size, hand operated; 8" stroke, 7" x 9½" platens electrically heated thermostatically controlled 1600 watts, 110 volts AC. Almost new. Address Box 2048, RUBBER AGE.

FOR SALE: One Eppenbach Nickel Silver Type QV-7 Colloid Mill, Serial No. 45236, equipped with a one HP Electric Specialty Motor, 110 Volts, 7000 RPM, Type KS, Motor Serial No. 291611. One Combination Bierer-Davis Oxygen and Air Aging Outfit with one Bomb 5" i.d. x 12" deep complete with motor driven pump and including 8 ft. connecting tubing to shut-off valve and pressure gauge, and with tubing connection between shut-off valve and oxygen cylinder. Equipped to operate on 110 volts, 60 cycle, A.C. circuit. One Southwick and Rhoads, General Foods Moisture Vapor Transmission Cabinet. The above are all practically new. For full particulars and prices, address Box 2068, RUBBER AGE.

FOR SALE: Pease, Peerless Model, Serial 2236R, 220 V. 34 Amp. 33" canvass, continuous blue print machine, washer and dryer. Completely overhauled—best working condition. Located in Akron, Ohio. $400.00. Address Box 2082, RUBBER AGE.

NINE (9) RUBBER HEEL MOLDS for sale. Sizes 4" to 12". ACE MOULDED RUBBER PRODUCTS CORPORATION, 353 Rockaway Avenue, Brooklyn 12, N. Y. Telephone: DIckens 2-8527.

FOR SALE: 14 x 32 Farrel three-roll calender with reduction gear drive and 25 HP motor—60 cycle A.C. 220 volts, Electric Brake. Purchased one year ago by us in guaranteed rebuilt condition. Now running for demonstration. Price F.O.B. our plant, $5,000.00. PARAMOUNT RUBBER COMPANY, 10401 Northlawn Avenue, Detroit 4, Michigan.

FOR SALE: 1—Thropp 15" x 30" Rubber Mill, complete, M.D.; 1—#3 Allen Tuber, motor driven, complete; 1—D & B 30" x 30" two opening Hydraulic Press, steel heated platens, 12" diameter ram; 1—24" x 24" Adamson, two opening Hydraulic Press with 10" ram; 2—24" x 24" Farrel, two opening Hydraulic Presses with 10" ram; 1—24" x 24" Thropp, two opening, Hydraulic Press with 10" ram; 1—18" x 18" Birmingham two opening, Hydraulic Press with 6" ram; 1—Holmes Rubber Cutter; 1—French Oil Hydropneumatic Accumulator; 1—Worthington Hydraulic Pump 1 x 6, 5 GPM 6000 pressure M.D.; 1—W & P Mixer; 1—8 x 13" Rubber Mill; 1—Stokes Rotary 32 punch Preform Press; 2—Hydraulic Presses, 20 x 20"; Dry Powder Mixers; Pulverizers; Grinders, etc. Send for complete list. CONSOLIDATED PRODUCTS COMPANY, INC., 14-19 Park Row, New York 7, N. Y.

FOR SALE: Hydraulic Presses: 600 ton Watson-Stillman double acting downward ram, platen 24" x 24"; 1—36" 12" ram 200 ton all steel construction; 2—20" x 20" 10" rams; 1—24" x 24" 6" ram 75 ton capacity; 1—52" x 26" 14" ram 400 ton capacity; 1—75" x 54" 12" ram 100 ton capacity; 2—15" x 15" 8½" rams; 2—12" x 12" 7½" rams; 1—26" x 45" 10" ram 100 ton capacity; 14" x 14" 5" ram 30 ton capacity; 20" x 20" 8" double acting upward ram; 20" x 20" 13" ram; 20" x 40" 2—8" rams; 2 post 20" x 24" 16" ram 400 ton capacity; 2—20" x 18" 200 ton capacity with pushbacks; 2—36" x 24" 250 ton capacity with pushbacks; 1—24" x 24" 200 ton capacity with pullbacks; 2 Laboratory 30 ton capacity, 1—6" x 6", 1—8" x 8". Pumps: Robertson Triplex 5 GPM 5000 lbs.; HPM Triplex 1½ GPM 2500 lbs.; 4 plunger vertical 6 GPM 2250 lbs.; National Triplex 3 GPM 4000 lbs.; Hele Shaw HLP 12 44 GPM 1200 lbs.; Goulds Vertical Triplex 11 GPM 1250 lbs.; HPM 1¾ GPM 2000 lbs. on high, 16 GPM 400 lbs. on low, V Belt Drive. Accumulators, Mills, Calenders, Extruders, etc. Highest prices paid for your used equipment. UNIVERSAL HYDRAULIC MACHINERY COMPANY, 285 Hudson Street, New York 13, N. Y.

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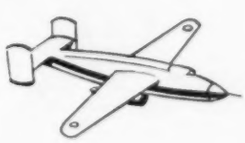

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